

SUNSHINE
AIR CONDITIONING



Digitized by

The Association for Preservation Technology International

For the

Building Technology Heritage Library

<http://archive.org/details/buildingtechnologyheritagelibrary>

Edwin E. Howes
Lincoln Iron Works
Rutland
Vermont.

ENGINEERING MANUAL

For Sunbeam
Air Conditioning Systems

SUNBEAM
AIR CONDITIONING UNIT

Copyright 1938

THE FOX FURNACE COMPANY
ELYRIA, OHIO

A DIVISION OF

AMERICAN & **S**TANDARD
RADIATOR & SANITARY
CORPORATION

SUNBEAM AIR CONDITIONING DATA SHEET

IN THIS CONCISE MANUAL is given you a quick yet accurate method of calculating the air conditioning requirements for any residence.

The tables which are used in this book are based on the latest recommendations of the Guide of the Society of Heating and Ventilating Engineers.

Sunbeam engineers, who have designed thousands of heating and Air Conditioning systems, have worked out the Factors using information from the Guide, so that one multiplication of the amount of wall, roof, doors, windows and other exposed surfaces provides you directly with the C. F. M. (Cubic Feet of Air Per Minute) required at 150 degrees to offset the heat losses. This simplification saves time and reduces the chances for errors in your calculations. At the same time, it is absolutely accurate.

The data in this manual should enable Sunbeam heating contractors to figure and design practically all Air Conditioning systems which they are endeavoring to sell. It will save them time and will eliminate delays when submitting plans and quotations.

A DIVISION OF
AMERICAN & **S**TANDARD
RADIATOR & SANITARY
CORPORATION

INFORMATION CONTAINED IN THIS MANUAL

1. How to estimate Heating Requirements.....	Page 2
2. Duct Losses.....	Page 3
3. Converting C. F. M. into Btu to Determine Size of Unit Needed.....	Page 3
4. Requirements When Heating Garages — Outside Air.....	Page 3
5. Bath Room Vents.....	Page 3
6. Factors for 89 different types of construction. Table A.....	Page 4
7. Factors for a temperature difference of 40° (30° above zero outside to 70° inside). Table B.....	Pages 5 and 6
8. Factors for temperature difference of 50°. Table C.....	Pages 5 and 6
9. Factors for temperature difference of 60°. Table D.....	Pages 5 and 6
10. Factors for temperature difference of 70°. Table E.....	Pages 5 and 6
11. Factors for temperature difference of 80°. Table F.....	Pages 5 and 6
12. Factors for temperature difference of 90°. Table G.....	Pages 5 and 6
13. Factors for temperature difference of 100°. Table H	Pages 5 and 6
14. Tables for Converting C. F. M. into Required Duct, Riser and Register Sizes. Table I.....	Page 7
15. Register Sizes and Free Areas (Note 1).....	Page 7
16. Simplified Duct and Register Schedule. Table J.....	Page 7
17. Chart for Converting C. F. M. to Square Inches (Area Chart).....	Pages 8 and 9
18. Cross Sectional Areas of Round Pipes. Table K.....	Page 9
19. Equivalent Round and Rectangular Ducts for Equal Friction. Table L.....	Page 10
20. Individual Pipe Systems.....	Page 11
21. Dampers in Individual Pipe Systems.....	Page 11
22. Trunk Line Design.....	Page 11
23. Dampers in Warm Air Ducts in Trunk Line System.....	Page 12
24. Return Air Ducts.....	Page 13
25. Dampers in Return Air Ducts in Trunk Line System.....	Page 13
26. Trunk Line Design Simplified Duct Schedule.....	Page 13
27. Data Sheet for Sample Layout.....	Page 14
28. A Sample Air Conditioning Layout.....	Page 15
29. Insulation of Ducts and Risers.....	Page 16
30. How to Avoid High Resistance in Ducts.....	Page 16
31. Designing for 5 air changes per hour (<i>As recommended by the "Technical Code for the Design and Installation of Mechanical Warm Air Heating Systems," published by the National Warm Air Heating and Air Conditioning Association</i>)	Page 16

THE BASIS OF THIS MANUAL

The Factors given in this manual are based on the following:

1. Temperature at the Warm Air Registers.....	150°	7. Velocities through Return Air Intakes.....	Approximately 500 F. P. M.
2. Velocity through the Warm Air Registers.....	Approximately 300 F. P. M.	8. Velocities through Return Air Risers and Ducts.....	Approximately 550 F. P. M.
3. Velocity through Risers.....	Approximately 450 F. P. M.	9. Temperature to be maintained in Living and Sleeping rooms.....	70°
4. Velocity through Branch Ducts.....	Approximately 500 F. P. M.	10. Temperature to be maintained in Bath Rooms, Nurseries, etc.....	85°
5. Velocity through Main Ducts	Approximately 550 F. P. M.	11. Temperature to be maintained in Garages....	50°
6. Temperature at Return Air Registers.....	65°		

F. P. M. = Feet Per Minute

HOW TO ESTIMATE HEATING REQUIREMENTS

INFILTRATION: Infiltration deals with the amount of air that leaks into a building, through the cracks around windows and doors. This air must be heated and the heat required to warm the incoming air plays a great part in the total heat requirement of a room.

To figure the amount of incoming air (infiltration), measure the linear feet of crack around the doors and windows on the side of the room which has the greatest amount of cracks. If a room has three sides exposed make sure that you do not use less than one-half of the total amount of crackage for the entire room.

For example: assume that a room has three sides exposed with a 3×5 window in each exposed wall. The linear feet of crack around one 3×5 double window is $5+5+3+3+3$ or 19 linear feet of crack for each side. If there were windows in two sides only, the amount of crack to use would be 19 feet. However, since there is the same amount of cracks on all three sides it will be necessary to use one-half of the total for all three sides, or one-half of $(19+19+19=57)$ or 29 feet.

Infiltration in closets should be added to the Room which the closet serves.

Infiltration computed on the basis of the cubic content of a building cannot give accurate results.

Below are diagrams of several types of windows encountered in residential construction.



Figure No. 1—Shows a double hung window 3'0" wide and 5'0" high. In determining the infiltration of this window we find that there are three cracks 3'0" long and two cracks 5'0" high, making a total of 19 linear feet.

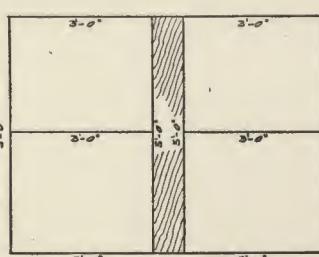


Figure No. 2—Shows two double hung windows in one opening. The crackage of this type of window is 38 linear feet or twice that of the single window in Figure No. 1.

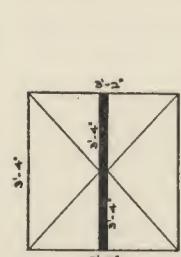


Figure No. 3—Illustrates a casement window with a vertical meeting rail or mullion. The crackage in this window is obtained by adding together the four vertical cracks of 3'4" each and the two horizontal cracks of 3'2" each, making a total of 19'8", or in even figures 20 linear feet. If this window did not have a meeting rail or mullion, there would have been one less 3'4" crack.

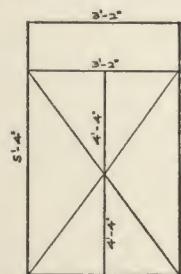


Figure No. 4 — This type of casement window is similar to No. 3 except that a transom is provided, and there is no meeting rail or mullion. To determine the crackage of this window add together the two cracks 5'4" long, one crack 4'4" long and three cracks 3'2" long. Added together the total length is 24'6" or 25' in round numbers.

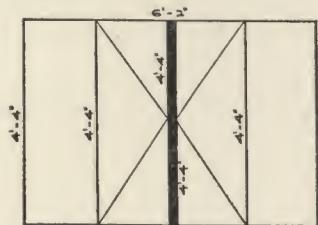


Figure No. 5—This figure shows another type of casement window. This window has fixed or stationary sash on each side. The center section, 4'4" high and 3'2" wide, is hinged for opening. To determine the linear feet of crack of this window we have six cracks 4'4" high and two cracks 6'2", long, or a total of 38'4" or 38' in even numbers. It will be noted that although the side sections of this window are fixed or stationary and do not open, the cracks are to be figured the same as for the portion that does open. This is advisable, because due to settling and shrinkage, the fixed portions often become loosened and allow infiltration.

GLASS: Glass is the square feet area of all windows and outside doors for each room. A door should be considered as a window. Measure full interior opening (Glass and Sash), but do not measure the Casement. Windows in closets should be added to the Room which the closet serves.

NET WALL: To obtain the net exposed wall measure the total length of the walls exposed to the outside and multiply by the ceiling height. From the result of this multiplication subtract the square feet of glass. A wall adjoining an unheated room should be figured as one-half exposed. Walls adjoining garages should be figured as totally exposed. When basement rooms are to be heated use all of exposed wall above grade and three feet below grade and figure as totally exposed. Exposed walls of Closets should be figured into the room which the Closet serves.

EXPOSED FLOORS: Floors Over Unexcavated Portions must be estimated on the basis of the total floor area using the factors given for floors "Over Unexcavated Spaces." Table "A," Page 4. Floors over excavated part of the basement in which heater is located need not be figured if basement has no partitions and rooms are within 25 foot radius of unit; floors greater than 25 foot distance from unit should be figured the same as for floors above unheated basement rooms. Floors Above Unheated Basement Rooms partitioned off from the heater room, should be figured on the basis of one-third of the floor area, using the floor factors from Table "A", Page 4, for floors "Exposed to Outside Air." Floors above unheated rooms other than basement rooms, should be figured as $\frac{1}{2}$ exposed and factors for floors, "Exposed to Outside Air" used. Floors Above Garages and Porches should be figured on the basis of the total floor area using the factors given for floors "Exposed to Outside Air." Exposed floors of closets are to be added to the Room the Closet serves.

EXPOSED CEILINGS: The square feet of ceiling exposed to the roof or attic, must be figured using the full area adjoining the attic or roof. In figuring a ceiling when the room above is unheated use one-half the square feet area. An attic floored in the center only, should be figured as entirely unfloored. Exposed ceilings of closets are to be added to the Rooms served by the Closet.

After obtaining all exposures and recording them on the Data Sheet refer to Table "A," page 4, and select the type of construction to be provided for. The figures opposite the constructions in Table "A" correspond with those in tables B, C, D, E, F, G and H, pages 5 and 6.

From Tables B, C, D, E, F, G and H, select first the outside temperature to be provided for and then insert on the Data Sheet under factors the figures appearing on the chart for the construction and temperature to be figured. See sample Data Sheet, page 14.

After you have found the amount of infiltration, glass, net wall, ceiling and floor exposure for each room and have multiplied these exposures by the proper factors for the type of construction used and the outside temperature encountered (Tables A to H), total the C. F. M. for each room as is shown on the sample Data Sheet on page 14, determine the location of registers, make a rough sketch of the duct system and add for duct losses as instructed on page 3.

DUCT LOSSES

A certain percentage of heat is lost from the ducts by radiation and convection. This duct loss must be provided for in sizing ducts so that the required amount of heat will be delivered at the registers.

It is not definitely known how much heat is lost for all ducts will not lose the same amount of heat. The type of installation and the amount of insulation greatly affects these losses.

We have adopted a method of allowing for a loss of 2% of the heat for each 10 feet of pipe from the center of the unit to the register. Example: For a 20 foot length of pipe allow for a 4% duct loss ($2\% \times 2 = 4\%$). Thus if the C. F. M. requirement of the room to which this duct leads is 100 C. F. M., you must increase it 4%, thereby providing in the duct a capacity of 104 (100 + 4) C. F. M. Risers and crossovers must be measured in adding duct losses.

In order to determine the duct loss to be added it is first necessary to tentatively locate the warm air registers.

HOW TO CONVERT C. F. M. INTO B. T. U. TO DETERMINE SIZE OF AIR CONDITIONING UNIT NEEDED

To obtain the proper size of Sunbeam Air Conditioning Unit, add together the C. F. M. required for each room, (Sub-total line on Data Sheet) without including the C. F. M. added to compensate for "duct losses." The C. F. M. added to ducts to compensate for "duct losses" is not included in the sub-total C. F. M. which determines the size of unit needed as an allowance for duct losses is made in "B. T. U. capacity at register" ratings of Sunbeam Units.

Multiply the sub-total C. F. M. of all spaces by 80 (1163 C. F. M. \times 80 = 93040 Btu) and add for garage heating and bath room vents when necessary.

GARAGE HEATING

The heating of garages is a special problem. Garage air must not be recirculated; it is therefore necessary to introduce outside air into the circulating system to replace air exhausted from the garage. This is done by connecting an outside air duct to the return air side of the system.

To determine the size of outside duct to install, refer to the Area Chart pages 8 and 9 and select the square inch free area opposite the C.F.M. figured (on the "sub-total" line of Sunbeam Data Sheet), using the column headed "MAIN"— Example: For 100 C.F.M. Area Chart indicates that 26 square inches free area would be required in the outside air duct. A damper must be placed in this duct.

When outside air is brought in it must be heated. Therefore, the garage sub-total C.F.M. (on the sub-total line of Sunbeam Data Sheet) must be placed in the space provided at the bottom of the data sheet and then multiplied by the proper factor from the following Compensating Factor Table. The result of this multiplication will be B. T. U., which will be added to the building loss and will enter into sizing the unit.

Example: Assume that a garage calls for 160 C.F.M. in 20 degrees below zero weather. The table below shows that the C.F.M. would be multiplied by 80 (B.T.U.) — $160 \times 80 = 12800$ B.T.U. This B.T.U. will then be added to the building B.T.U. loss in arriving at the proper size of Unit.

33 Btu for an outside temp. of 30 degrees above zero	61 Btu for an outside temp. of zero
42 "	71 " 10 degrees below zero
52 " 10 "	80 " 20 "
	90 " 30 "

IMPORTANT — When garages are to be heated, the heat duct must be an individual pipe leading from the Unit to the garage. Garages must never be heated with a branch leading from a trunk line supplying other rooms.

BATH ROOM VENTS

Bath rooms are never equipped with return air intakes and often become air-bound when the doors are closed, so that additional heated air cannot be delivered to the room. It is recommended that a vent grille be placed close to the floor with a stack to the attic, thus permitting the cooler air to be forced into the attic when pressure has been built up. This will permit a flow of heated air into the room. It is safe to assume that bath room doors will not be kept closed more than $\frac{1}{3}$ of the time and the factors contained in this Manual are based on this assumption.

When the total C.F.M. for bath rooms vented exceeds 150 C.F.M., an outside air duct should be installed. For less than 150 C.F.M. it is not necessary to add an outside air duct as infiltration will supply the necessary extra air.

To determine the size of outside air duct required, use $\frac{1}{3}$ of the C.F.M. figured for the bath rooms and select from the Area Chart, pages 8 and 9, the square inch free area under the heading "MAIN"— Example: Assume two bath rooms having a total of 240 C.F.M. ($140 + 100$). $\frac{1}{3}$ of 240 C.F.M. = 80 C.F.M. required for an outside air duct. The Area Chart, under heading "MAIN," shows that 80 C.F.M. would require a duct area of 21 square inches.

When bath rooms are vented, outside air must be supplied by the outside air duct and this air must be heated. Therefore, the bath room or bath rooms' sub-total C.F.M. (on the sub-total line of Sunbeam Data Sheet) must be placed in the space provided at the bottom of the Data Sheet and then multiplied by the proper factor from the following Compensating Factor Table. The result of this multiplication will be B.T.U. which will be added to the building loss and will enter into selecting the proper size of Unit.

Example: For 240 C.F.M. in zero weather the factor 11 will be used — $240 \times 11 = 2640$ B.T.U. to be added when bath rooms are vented.

2 Btu for an outside temp. of 30 degrees above zero	11 Btu for an outside temp. of zero
5 " 20 "	14 " 10 degrees below zero
8 " 10 "	17 " 20 "
	21 " 30 "

When garages are being heated and bath rooms vented, an outside air duct must be used and the 150 C.F.M. limit for bath rooms must be disregarded in these cases. The outside air duct size would then be based on the sub-total garage C.F.M. (on the sub-total line of Sunbeam Data Sheet) plus $\frac{1}{3}$ of the bath room C.F.M. (sub-totals). To convert this to B.T.U., use the factors and instructions given for garages and bath room vents.

If system is to be designed in accordance with the "Technical Code for the Design and Installation of Mechanical Warm Air Heating Systems," published by the National Warm Air Heating and Air Conditioning Association, WHICH REQUIRES FIVE AIR CHANGES PER HOUR, refer to pages 16 and 17 for method of calculation.

Table A
DIFFERENT TYPES OF CONSTRUCTION AND SOURCES OF HEAT LOSS

No.	No.
1. Infiltration—average double hung windows and wood casements.	50. 8" Hollow cinder blocks—no plaster.
1A. Infiltration—poorly fitted double hung windows and doors.	51. 8" Hollow cinder blocks and $\frac{1}{2}$ " plaster.
1B. Infiltration—residential casements (metal).	52. 12" Hollow cinder blocks—no plaster.
2. Glass.	53. 12" Hollow cinder blocks and $\frac{1}{2}$ " plaster.
3. Glass and storm windows and doors.	
4. Wood siding or shingles, sheathing, studs, lath and plaster.	54. Stucco on standard frame walls.
5. Wood siding, studs, lath and plaster.	55. Stucco on standard frame walls with plaster on $\frac{1}{2}$ " rigid insulation.
6. Wood siding or shingles, sheathing, studs, $\frac{1}{2}$ " rigid insulation and plaster.	56. Stucco on standard frame walls—2" rockwool insulation.
7. Wood siding or shingles, sheathing, 2" rockwool in studs, lath and plaster.	57. Stucco on standard frame walls— $3\frac{1}{8}$ " rockwool fill.
8. Wood siding or shingles, sheathing, $3\frac{1}{8}$ " rockwool fill in studs, lath and plaster.	58. Floors—single floor on joist, no ceiling below—exposed to outside air.
9. Wood siding, $\frac{1}{2}$ " rigid insulation (instead of sheathing), studs, lath and plaster.	59. Floors—single floor on joist—over unexcavated portion.
10. Wood shingles— $\frac{1}{2}$ " rigid insulation (instead of sheathing), studs, lath and plaster.	60. Floors—double floor on joist, no ceiling below—exposed to outside air.
11. Wood siding— $\frac{1}{2}$ " rigid insulation (instead of sheathing), studs, $\frac{1}{2}$ " rigid insulation and plaster.	61. Floors—double floor on joist, over unexcavated portion.
12. Wood shingles— $\frac{1}{2}$ " rigid insulation (instead of sheathing), studs, $\frac{1}{2}$ " rigid insulation and plaster.	62. Floors—single floor, ceiling below—exposed to outside air.
13. Brick veneer on frame.	63. Floors—double floor, ceiling below—exposed to outside air.
14. Brick veneer and $\frac{1}{2}$ " rigid insulation for lath.	64. Floors—double floor, ceiling below— $3\frac{1}{8}$ " rockwool—exposed to outside air.
15. Brick veneer and $\frac{1}{2}$ " flexible insulation in studs.	65. Floors—double floor, ceiling below— $3\frac{1}{8}$ " rockwool—over unexcavated space.
16. Brick veneer and 2" rockwool insulation in studs.	
17. Brick veneer and $3\frac{1}{8}$ " rockwool fill in studs.	66. 4" Concrete floor with 3" cinders as base on ground.
18. 4" Brick— $\frac{1}{2}$ " rigid insulation (instead of sheathing), studs, lath and plaster.	67. 4" Concrete floor with 3" cinders as base with single floor on wood sleepers.
19. 4" Brick— $\frac{1}{2}$ " rigid insulation (instead of sheathing), studs, $\frac{1}{2}$ " rigid insulation, plaster.	
20. 8" Solid brick and $\frac{1}{2}$ " plaster.	68. Ceiling—lath and plaster—attic unfloored and ventilated.
21. 8" Solid brick—furred, lath and plaster.	69. Ceiling—lath and plaster—attic unfloored but not ventilated.
22. 12" Solid brick and $\frac{1}{2}$ " plaster.	70. Ceiling—lath and plaster—attic floored and ventilated.
23. 12" Solid brick—furred, lath and plaster.	71. Ceiling—lath and plaster—attic floored but not ventilated.
24. 4" Brick on 4" hollow tile and $\frac{1}{2}$ " plaster.	72. Ceiling— $\frac{1}{2}$ " rigid insulation and plaster—attic unfloored and ventilated.
25. 4" Brick on 4" hollow tile—furred, lath and plaster.	73. Ceiling— $\frac{1}{2}$ " rigid insulation and plaster—attic unfloored but not ventilated.
26. 4" Brick on 8" hollow tile and $\frac{1}{2}$ " plaster.	74. Ceiling— $\frac{1}{2}$ " rigid insulation and plaster—attic floored and ventilated.
27. 4" Brick on 8" hollow tile—furred, lath and plaster.	75. Ceiling— $\frac{1}{2}$ " rigid insulation and plaster—attic floored but not ventilated.
28. 8" Hollow tile—no plaster.	76. Ceiling—lath and plaster—2" rockwool—attic unfloored and ventilated.
29. 8" Hollow tile and plaster.	77. Ceiling—lath and plaster—2" rockwool—attic unfloored but not ventilated.
30. 8" Hollow tile—furred, lath and plaster.	78. Ceiling—lath and plaster— $3\frac{1}{8}$ " rockwool—attic unfloored and ventilated.
31. 12" Hollow tile—no plaster.	79. Ceiling—lath and plaster— $3\frac{1}{8}$ " rockwool—attic unfloored but not ventilated.
32. 12" Hollow tile and plaster.	80. Ceiling—lath and plaster—2" rockwool—attic floored and ventilated.
33. 12" Hollow tile—furred, lath and plaster.	81. Ceiling—lath and plaster—2" rockwool—attic floored but not ventilated.
34. 16" Limestone or sandstone—no plaster.	82. Ceiling—lath and plaster— $3\frac{1}{8}$ " rockwool—attic floored and ventilated.
35. 16" Limestone or sandstone and $\frac{1}{2}$ " plaster.	83. Ceiling—lath and plaster— $3\frac{1}{8}$ " rockwool—attic floored but not ventilated.
36. 16" Limestone or sandstone—furred, lath and plaster.	
37. 8" Concrete—no plaster.	84. Pitched roof—no attic—lath and plaster.
38. 8" Concrete and $\frac{1}{2}$ " plaster.	85. Pitched roof—no attic— $\frac{1}{2}$ " rigid insulation and plaster.
39. 8" Concrete—furred, lath and plaster.	86. Pitched roof—no attic—lath and plaster— $3\frac{1}{8}$ " rockwool.
40. 10" Concrete—no plaster.	
41. 10" Concrete and $\frac{1}{2}$ " plaster.	87. Flat roof (built up)—ceiling below—no insulation.
42. 10" Concrete—furred, lath and plaster.	88. Flat roof (built up)—ceiling below— $\frac{1}{2}$ " rigid insulation and plaster.
43. 12" Concrete—no plaster.	89. Flat roof (built up)—ceiling below— $3\frac{1}{8}$ " rockwool.
44. 12" Concrete and $\frac{1}{2}$ " plaster.	
45. 12" Concrete—furred, lath and plaster.	
46. 8" Hollow concrete blocks—no plaster.	
47. 8" Hollow concrete blocks and $\frac{1}{2}$ " plaster.	
48. 12" Hollow concrete blocks—no plaster.	
49. 12" Hollow concrete blocks and $\frac{1}{2}$ " plaster.	

The factors given on pages 5 and 6, when multiplied by amount of infiltration and area of glass, net wall, floor or ceiling, will give the C. F. M. (cubic feet of air per minute) that must be delivered into each room at 150 degrees Register Temperature to supply the heat that is lost through the materials of construction, and to heat the cold air that enters by infiltration.

For example: Assume you are figuring an 8" brick wall that is furred, lathed and plastered. Reference to Table "A" refers you to No. 21. If the outside temperature is zero and the room is a living room which is to be heated to 70 degrees from Table "E" opposite No. 21, under living room, the factor .31 appears. Factor .31 is to be multiplied by the square feet of exposed wall and the result will be the cubic feet of 150 degree air required for the exposed wall in a room to be heated to 70 degrees. To provide for a room temperature of 85 degrees such as in bath rooms, the factor .45 would be used for the above construction and an outside temperature of zero.

Following is another example of the use of Table A above and the Tables on pages 5 and 6:

The living room of the sample plan on page 15 has a net wall (total wall less glass) exposure of 189 square feet. To find the C. F. M. required for the heat loss through this wall find in Table A above the Construction No. for Brick Veneer on Frame with $\frac{1}{2}$ " rigid insulation for lath, which is No. 14. Next turn to pages 5 and 6 and locate factor for Construction No. 14 (zero to 70°) which is .19 and is located in Table E. Multiply area of wall by the factor to obtain the necessary C. F. M., $189 \times .19 = 36$ C. F. M.

FACTORS FOR VARIOUS TYPES OF CONST AND FOR VARIOUS DEGREES OF

Construction No. (Table A)	TABLE B C.F.M. for 30° Above Zero			TABLE C C.F.M. for 20° Above Zero			TABLE D C.F.M. for 10° Above Zero			TABLE E C.F.M. for Zero			TABLE F C.F.M. for 10° Below Zero			TABLE G C.F.M. for 20° Below Zero			TABLE H C.F.M. for 30° Below Zero		
	Garages 50°	Living Rooms 70°	Baths 85°	Garages 50°	Living Rooms 70°	Baths 85°	Garages 50°	Living Rooms 70°	Baths 85°	Garages 50°	Living Rooms 70°	Baths 85°	Garages 50°	Living Rooms 70°	Baths 85°	Garages 50°	Living Rooms 70°	Baths 85°	Garages 50°	Living Rooms 70°	Baths 85°
1	.17	.39	.65	.25	.49	.77	.33	.59	.89	.42	.69	1.01	.50	.78	1.13	.59	.88	1.25	.67	.98	1.37
1a	.28	.66	1.10	.42	.83	1.30	.06	.99	1.51	.71	1.16	1.71	.85	1.30	1.91	.99	1.49	2.11	1.13	1.66	2.31
1b	.22	.52	.86	.33	.65	1.02	.44	.78	1.18	.55	.91	1.34	.66	1.04	1.49	.77	1.17	1.65	.89	1.30	1.81
2	.27	.62	1.04	.40	.78	1.23	.53	.94	1.42	.66	1.09	1.61	.80	1.25	1.79	.93	1.40	1.98	1.06	1.56	2.18
3	.11	.25	.41	.16	.31	.49	.21	.37	.56	.26	.43	.64	.32	.50	.71	.37	.56	.79	.42	.62	.87
4	.06	.14	.24	.09	.18	.28	.12	.22	.33	.15	.25	.37	.18	.29	.41	.21	.32	.46	.24	.36	.50
5	.08	.19	.32	.12	.24	.38	.16	.29	.44	.21	.34	.50	.25	.39	.56	.29	.43	.61	.33	.48	.67
6	.04	.10	.17	.07	.13	.21	.09	.16	.24	.11	.18	.27	.13	.21	.30	.16	.24	.33	.18	.26	.37
7	.02	.05	.08	.03	.06	.10	.04	.07	.11	.05	.09	.13	.06	.10	.14	.07	.11	.16	.08	.12	.17
8	.02	.04	.06	.02	.05	.08	.03	.06	.09	.04	.07	.10	.05	.08	.11	.06	.09	.12	.07	.10	.13
9	.06	.13	.22	.08	.17	.26	.11	.20	.30	.14	.23	.34	.17	.27	.38	.20	.30	.42	.23	.33	.46
10	.05	.11	.18	.07	.14	.22	.09	.17	.25	.12	.19	.28	.14	.22	.32	.16	.25	.35	.19	.28	.38
11	.04	.10	.17	.06	.12	.20	.08	.15	.23	.11	.17	.26	.13	.20	.29	.15	.22	.32	.17	.25	.35
12	.04	.08	.14	.05	.10	.16	.07	.12	.19	.09	.15	.21	.11	.17	.24	.12	.19	.26	.14	.21	.29
13	.07	.15	.26	.10	.19	.30	.13	.23	.35	.16	.27	.40	.20	.31	.44	.23	.35	.49	.26	.39	.54
14	.05	.11	.18	.07	.14	.22	.09	.17	.25	.12	.19	.28	.14	.22	.32	.16	.25	.35	.19	.28	.38
15	.04	.10	.17	.06	.12	.20	.08	.15	.23	.11	.17	.26	.13	.20	.29	.15	.22	.32	.17	.25	.35
16	.02	.06	.09	.04	.07	.11	.05	.08	.13	.06	.10	.14	.07	.11	.16	.08	.12	.18	.09	.14	.19
17	.02	.04	.07	.03	.05	.08	.03	.06	.09	.04	.07	.10	.05	.08	.12	.06	.09	.13	.07	.10	.14
18	.06	.14	.24	.09	.18	.28	.12	.22	.33	.15	.25	.37	.18	.29	.41	.21	.32	.46	.24	.36	.50
19	.04	.10	.17	.07	.13	.10	.09	.16	.24	.11	.18	.27	.13	.21	.30	.16	.24	.33	.18	.26	.37
20	.11	.25	.42	.16	.32	.50	.22	.38	.58	.27	.44	.65	.32	.51	.73	.38	.57	.81	.43	.64	.88
21	.08	.18	.29	.11	.22	.35	.15	.27	.40	.19	.31	.45	.23	.35	.51	.26	.40	.56	.30	.44	.62
22	.08	.19	.31	.12	.23	.37	.16	.28	.43	.20	.33	.48	.24	.38	.54	.28	.42	.60	.32	.47	.65
23	.06	.14	.23	.09	.17	.27	.12	.21	.31	.15	.24	.36	.18	.28	.40	.21	.31	.44	.24	.35	.48
24	.10	.24	.40	.15	.30	.47	.20	.36	.54	.25	.42	.61	.30	.47	.68	.35	.53	.75	.40	.59	.83
25	.07	.17	.28	.11	.21	.33	.14	.25	.38	.18	.29	.43	.21	.33	.48	.25	.37	.53	.28	.41	.58
26	.08	.18	.30	.12	.23	.36	.16	.27	.41	.19	.32	.47	.23	.36	.52	.27	.41	.58	.31	.46	.63
27	.06	.14	.23	.09	.17	.27	.12	.21	.31	.15	.24	.36	.18	.28	.40	.21	.31	.44	.24	.35	.48
28	.10	.23	.38	.14	.28	.45	.19	.34	.51	.24	.40	.58	.29	.45	.65	.34	.51	.72	.39	.57	.79
29	.09	.22	.36	.14	.27	.42	.18	.32	.49	.23	.38	.55	.28	.43	.62	.32	.48	.68	.37	.54	.75
30	.07	.15	.26	.10	.19	.30	.13	.23	.35	.16	.27	.40	.20	.31	.44	.23	.35	.49	.26	.39	.54
31	.07	.17	.29	.11	.21	.34	.15	.26	.39	.18	.30	.44	.22	.34	.49	.26	.39	.54	.29	.43	.60
32	.07	.16	.27	.10	.20	.32	.14	.24	.36	.17	.28	.41	.20	.32	.46	.24	.36	.51	.27	.40	.56
33	.05	.13	.21	.08	.16	.25	.11	.20	.29	.14	.22	.33	.16	.25	.37	.19	.29	.40	.22	.32	.44
34	.12	.27	.45	.17	.34	.53	.23	.41	.62	.29	.47	.70	.35	.54	.78	.40	.61	.86	.46	.68	.94
35	.11	.25	.41	.16	.31	.49	.21	.37	.56	.26	.43	.64	.32	.50	.71	.37	.56	.79	.42	.62	.87
36	.07	.17	.29	.11	.21	.34	.15	.26	.39	.18	.30	.44	.22	.34	.49	.26	.39	.54	.29	.43	.60
37	.16	.38	.63	.24	.48	.75	.32	.57	.87	.41	.67	.98	.49	.76	1.10	.57	.86	1.21	.65	.95	1.33
38	.15	.35	.58	.22	.44	.69	.30	.52	.79	.37	.61	.90	.44	.70	1.00	.52	.78	1.11	.59	.87	1.21
39	.09	.22	.36	.14	.27	.42	.18	.32	.49	.23	.38	.55	.28	.43	.62	.32	.48	.68	.37	.54	.75
40	.15	.34	.57	.22	.43	.67	.29	.51	.78	.36	.60	.88	.44	.69	.98	.51	.77	1.09	.58	.86	1.19
41	.13	.31	.52	.20	.39	.62	.27	.47	.72	.34	.55	.81	.40	.63	.91	.47	.71	1.00	.54	.79	1.10
42	.09	.20	.34	.13	.26	.40	.17	.31	.46	.22	.36	.53	.26	.41	.59	.30	.46	.65	.35	.51	.71
43	.13	.31	.52	.20	.39	.61	.26	.46	.70	.33	.54	.80	.40	.62	.89	.46	.70	.98	.53	.77	1.08
44	.12	.29	.48	.18	.36	.57	.24	.43	.65	.31	.50	.74	.37	.57	.83	.43	.65	.91	.49	.72	1.00
45	.08	.19	.31	.12	.23	.37	.16	.28	.43	.20	.33	.48	.24	.38	.54	.28	.42	.60	.32	.47	.65

Any and all rooms to be heated to 70 degrees

CONSTRUCTION AND SOURCES OF HEAT LOSS FOR TEMPERATURE DIFFERENCE

Construction No. (Table A)	TABLE B C.F.M. for 30° Above Zero			TABLE C C.F.M. for 20° Above Zero			TABLE D C.F.M. for 10° Above Zero			TABLE E C.F.M. for Zero			TABLE F C.F.M. for 10° Below Zero			TABLE G C.F.M. for 20° Below Zero			TABLE H C.F.M. for 30° Below Zero		
	Garages 50°	Living Rooms 70°	Baths 85°	Garages 50°	Living Rooms 70°	Baths 85°	Garages 50°	Living Rooms 70°	Baths 85°	Garages 50°	Living Rooms 70°	Baths 85°	Garages 50°	Living Rooms 70°	Baths 85°	Garages 50°	Living Rooms 70°	Baths 85°	Garages 50°	Living Rooms 70°	Baths 85°
46	.13	.31	.52	.20	.39	.61	.26	.46	.70	.33	.54	.80	.40	.62	.89	.46	.70	.98	.53	.77	1.08
47	.12	.29	.48	.18	.36	.57	.24	.43	.65	.31	.50	.74	.37	.57	.83	.43	.65	.91	.49	.72	1.00
48	.12	.27	.45	.17	.34	.53	.23	.41	.62	.29	.47	.70	.35	.54	.78	.40	.61	.86	.46	.68	.94
49	.11	.25	.42	.16	.32	.50	.22	.38	.58	.27	.44	.65	.32	.51	.73	.38	.57	.81	.43	.64	.88
50	.10	.23	.39	.15	.29	.46	.20	.35	.53	.25	.41	.60	.30	.46	.67	.35	.52	.74	.40	.58	.81
51	.09	.22	.36	.14	.27	.42	.18	.32	.49	.23	.38	.55	.28	.43	.62	.32	.48	.68	.37	.54	.75
52	.09	.20	.34	.13	.26	.40	.17	.31	.46	.22	.36	.53	.26	.41	.59	.30	.46	.65	.35	.51	.71
53	.08	.19	.32	.12	.24	.38	.16	.29	.44	.21	.34	.50	.25	.39	.56	.29	.43	.61	.33	.48	.67
54	.07	.17	.29	.11	.21	.34	.15	.26	.39	.18	.30	.44	.22	.34	.49	.26	.39	.54	.29	.43	.60
55	.05	.12	.20	.08	.15	.24	.10	.18	.28	.13	.21	.31	.16	.24	.35	.18	.27	.39	.21	.30	.42
56	.02	.06	.09	.04	.07	1.10	.05	.08	.13	.06	.10	.14	.07	.11	.16	.08	.12	.18	.09	.14	.19
57	.02	.04	.07	.03	.05	.08	.04	.06	.10	.04	.07	.11	.05	.08	.12	.06	.09	.13	.07	.10	.15
58	.14	.32	.53	.20	.40	.63	.27	.48	.73	.34	.56	.82	.41	.64	.92	.48	.72	1.02	.55	.80	1.11
59	.07	.16	.27	.10	.20	.32	.14	.24	.36	.17	.28	.41	.20	.32	.46	.24	.36	.51	.27	.40	.56
60	.09	.22	.37	.14	.28	.44	.19	.33	.50	.24	.39	.57	.28	.44	.64	.33	.50	.70	.38	.55	.77
61	.05	.11	.18	.07	.14	.22	.09	.17	.25	.12	.19	.28	.14	.22	.32	.16	.25	.35	.19	.28	.38
62	.08	.19	.32	.12	.24	.38	.16	.29	.44	.21	.34	.50	.25	.39	.56	.29	.43	.61	.33	.48	.67
63	.07	.15	.26	.10	.19	.32	.13	.23	.35	.16	.27	.40	.20	.31	.44	.23	.35	.49	.26	.39	.54
64	.02	.03	.06	.02	.04	.07	.03	.05	.08	.04	.06	.09	.04	.07	.10	.05	.08	.11	.06	.09	.12
65	.01	.02	.03	.01	.02	.03	.01	.03	.04	.02	.03	.04	.02	.03	.05	.03	.04	.05	.03	.04	.06
66	.04	.08	.14	.05	.10	.16	.07	.12	.19	.09	.15	.21	.11	.17	.24	.12	.19	.26	.14	.21	.29
67	.02	.04	.06	.02	.05	.08	.03	.06	.09	.04	.07	.10	.05	.08	.11	.06	.09	.12	.07	.10	.13
68	.16	.38	.63	.24	.48	.75	.32	.57	.87	.41	.67	.98	.49	.76	1.10	.57	.86	1.21	.65	.95	1.33
69	.08	.19	.31	.12	.23	.37	.16	.28	.43	.20	.33	.48	.24	.38	.54	.28	.42	.60	.32	.47	.65
70	.07	.17	.28	.11	.21	.33	.14	.25	.38	.18	.29	.43	.21	.33	.48	.25	.37	.53	.28	.41	.58
71	.05	.12	.19	.07	.15	.23	.10	.17	.26	.12	.20	.30	.15	.23	.33	.17	.26	.37	.20	.29	.40
72	.08	.19	.32	.12	.24	.38	.16	.29	.44	.21	.34	.50	.25	.39	.56	.29	.43	.61	.33	.48	.67
73	.05	.13	.21	.08	.16	.25	.11	.19	.29	.14	.20	.33	.16	.25	.37	.19	.29	.40	.22	.32	.44
74	.05	.12	.19	.07	.15	.23	.10	.17	.26	.12	.20	.30	.15	.23	.33	.17	.26	.37	.20	.29	.40
75	.04	.09	.15	.06	.11	.17	.08	.13	.20	.09	.15	.23	.11	.18	.25	.13	.20	.28	.15	.22	.31
76	.03	.06	.10	.04	.08	.12	.05	.09	.14	.07	.11	.16	.08	.12	.18	.09	.14	.20	.11	.16	.22
77	.02	.06	.09	.04	.07	.11	.05	.08	.13	.06	.10	.14	.07	.11	.16	.08	.12	.18	.09	.14	.19
78	.02	.04	.07	.03	.05	.09	.04	.07	.10	.05	.08	.11	.06	.09	.13	.07	.10	.14	.07	.11	.15
79	.02	.04	.07	.03	.05	.08	.03	.06	.09	.04	.07	.10	.05	.08	.11	.06	.09	.12	.07	.10	.14
80	.02	.05	.09	.03	.06	.10	.04	.08	.12	.05	.09	.13	.07	.10	.15	.08	.12	.16	.09	.13	.18
81	.02	.05	.08	.03	.06	.09	.04	.07	.10	.05	.08	.12	.06	.09	.13	.07	.10	.14	.08	.11	.16
82	.02	.04	.06	.02	.05	.07	.03	.06	.09	.04	.07	.10	.05	.08	.11	.06	.08	.12	.06	.09	.13
83	.01	.03	.06	.02	.04	.07	.03	.05	.08	.04	.06	.09	.04	.07	.10	.05	.08	.11	.06	.09	.12
84	.08	.19	.31	.12	.23	.37	.16	.28	.43	.20	.33	.48	.24	.38	.54	.28	.42	.60	.32	.47	.65
85	.05	.13	.21	.08	.16	.25	.11	.19	.29	.14	.22	.33	.16	.25	.37	.19	.29	.40	.22	.32	.44
86	.02	.04	.06	.02	.04	.07	.03	.05	.08	.04	.06	.09	.05	.07	.10	.05	.08	.11	.06	.09	.12
87	.08	.18	.29	.11	.22	.35	.15	.27	.40	.19	.31	.46	.23	.35	.51	.26	.40	.56	.30	.44	.62
88	.05	.12	.19	.07	.15	.23	.10	.17	.26	.12	.20	.30	.15	.23	.33	.17	.26	.37	.20	.29	.40
89	.01	.03	.06	.02	.04	.07	.03	.05	.08	.04	.06	.09	.04	.07	.10	.05	.08	.11	.06	.09	.12

es should be considered as living rooms.

Table I

WARM AIR			C. F. M. (Based on Maximum Capacity of Registers at 300 F. P. M.)	RETURN AIR	
Pipe	Reg.	Riser		Return Air Intakes	Return Air Pipe
6"	10"x4"	3"x10"	44 and less	10"x4"	
	10"x5"	3"x10"	59	10"x4"	
	12"x5"	3"x12"	72	10"x4"	6"
	10"x6"	3"x10"	74	12"x4"	
	14"x5"	3"x14"	85	12"x4"	
	12"x6"	3"x12"	91	14"x4"	
7"	10"x8"	3 $\frac{1}{4}$ "x10"	102	14"x4"	
	14"x6"	3"x14"	107	12"x5"	7"
	12"x8"	3 $\frac{1}{4}$ "x12"	123	12"x6"	
8"	30"x4"	3"x30"	138	14"x5"	
	14"x8"	3 $\frac{1}{4}$ "x14"	143	14"x6"	
	12"x10"	4 $\frac{1}{2}$ "x12"	163	14"x6"	8"
9"	24"x6"	3"x24"	187	20"x5"	
	14"x10"	4 $\frac{1}{2}$ "x14"	191	20"x5"	
	20"x8"	3 $\frac{1}{2}$ "x20"	217	24"x6"	9"
10"	30"x6"	3"x30"	236	24"x6"	
	24"x8"	3 $\frac{1}{2}$ "x24"	261	30"x5"	
12"	30"x8"	3 $\frac{1}{2}$ "x30"	329	30"x6"	12"

NOTES

- 1—Register sizes based on a free area of not less than 60%. The register size used by register manufacturers is the size of the register box opening. To obtain overall or outside dimensions of a register refer to the register manufacturer's catalog.
- 2—Some of the risers listed above, for registers 4" and 5" high, are oversize. This is because each riser must be of the same width as the register to which it leads, unless a costly transitional fitting is made from a small riser to a large register. We do not advise using a riser depth of less than three (3") inches.
- 3—The following are standard commercial size risers and maximum capacity at 450 Foot Velocity:
 - 3 " x 10" (Maximum Capacity—95 C.F.M.)
 - 3 $\frac{1}{4}$ " x 10" (Maximum Capacity—102 C.F.M.)
 - 3 $\frac{1}{2}$ " x 10" (Maximum Capacity—110 C.F.M.)
 - 3 " x 12" (Maximum Capacity—114 C.F.M.)
 - 3 $\frac{1}{4}$ " x 12" (Maximum Capacity—123 C.F.M.)
 - 3 $\frac{1}{2}$ " x 12" (Maximum Capacity—132 C.F.M.)
 - 3 " x 14" (Maximum Capacity—132 C.F.M.)
 - 3 $\frac{1}{4}$ " x 14" (Maximum Capacity—143 C.F.M.)
 - 3 $\frac{1}{2}$ " x 14" (Maximum Capacity—154 C.F.M.)
- 4—If the above Table "I" calls for a 3" x 14" riser and you do not carry this size in stock you can select the next larger register which will fit the stock size riser. For example, a 3" x 12" riser and a 12" x 6" register could be used in place of a 3" x 14" riser and 14" x 5" register. It is not good practice to use registers and risers of smaller sizes than called for by the C. F. M. figured.
- 5—If the C. F. M. which you require does not appear on Table "I", use the next larger C. F. M. listed and select the pipe, register and riser.
- 6—If the C. F. M. obtained for one room is too great for one register take one-half, one-third or one-fourth, of the C. F. M. figured and select two, three or four registers and risers of the proper size for the C. F. M.
- 7—Table "I" is drawn up for round pipe installations. Should you wish to use rectangular ducts you can select the proper size as follows:

Assume you have a 7" round pipe required and desire to convert it into a rectangular pipe 8" deep. Refer to table "L" page 10, under heading "side of rectangular duct," locate the figure 8 and read across to the figure nearest to the diameter of pipe (7") which is 6.9 then up to figure 5 on the top line which indicates the other dimension of the duct. This will give a 5" x 8" duct for a 7" round pipe. By the same procedure we find that a 3 $\frac{1}{2}$ " x 12 $\frac{1}{2}$ " duct would be required for a 7" pipe. However, for all practical purposes a standard 3 $\frac{1}{4}$ " x 12" duct will suffice.

Table J
SIMPLIFIED DUCT AND REGISTER SCHEDULE

Simplification and standardization of duct and register sizes will reduce the cost of air conditioning installations. Also, it will enable dealers and jobbers to stock all the sizes needed for an average air conditioning installation with a relatively low inventory.

To promote simplification and standardization of sizes, the schedule given below has been developed. Since every run is equipped with a damper, any duct that is oversize can be dampered down to actual requirements by closing the damper as much as necessary, when the system is being balanced.

CFM	WARM AIR
98 or less	10" x 8" Baseboard Register 10" x 6" High Wall Register 10" x 3 $\frac{1}{4}$ " Branch or Riser 6" Round Pipe Branch 3" x 8" Trunk and Branch Takeoff All trunk lines should be 8" deep and as wide as necessary. In a standardized 8" deep trunk, 3 inches in width is required in order to supply each branch handling 98 C. F. M. or less.
CFM (Max.)	RETURN AIR
126	10" x 6" Register or Intake
175	10" x 8" Register or Intake
124	10" x 3 $\frac{1}{4}$ " Riser or Duct
196	One Stud Space
346	2" x 8" Joist Space 16" on centers (90 Sq. Ins.) Size trunk line according to Area Chart (page 8 and 9), standardizing on a duct 8" deep.

CFM	WARM AIR
99 to 128	12" x 8" Baseboard Register 12" x 6" High Wall Register 12" x 3 $\frac{1}{4}$ " Branch or Riser 7" Round Pipe Branch 4" x 8" Trunk and Branch Takeoff In a standardized 8" deep trunk line, 4 inches in width is required in order to supply each branch handling from 99 to 128 C. F. M.
CFM (Max.)	RETURN AIR
151	12" x 6" Register or Intake
213	12" x 8" Register or Intake
150	12" x 3 $\frac{1}{4}$ " Riser or Duct
196	One Stud Space (2nd floor maximum)
213	One Stud Space (1st floor only when opening 4" x 14" to basement duct is used)
346	2" x 8" Joist Space 16" on center (90 Sq. Ins.) Size trunk line according to Area Chart (page 8 and 9), standardizing on a duct 8" deep.
376	30" x 6" Baseboard Register or Intake when used with two unlined stud spaces.
300	30" x 6" Baseboard Register or Intake when used with two 3 $\frac{1}{4}$ " x 12" stacks or risers.

For application of this schedule note illustration of Trunk Line Design on Page 13.

Note: Where 14" wide risers must be used the table below should be followed.

CFM	WARM AIR
129 to 148	14" x 8" Baseboard Register 14" x 6" High Wall Register 14" x 3 $\frac{1}{4}$ " Branch or Riser 8" Round Pipe Branch 5" x 8" Trunk and Branch Takeoff In a standardized 8" deep trunk line, 5 inches in width is required in order to supply each branch handling from 129 to 148 C.F.M.
CFM (Max.)	RETURN AIR
178	14" x 6" Register or Intake
248	14" x 8" Register or Intake
173	14" x 3 $\frac{1}{4}$ " Riser or Duct
196	One Stud Space
346	2" x 8" Joist Space 16" on center (90 Sq. Ins.)

Size trunk line according to Area Chart (page 8 and 9), standardizing on a duct 8" deep.

AREA CHART

	Main	Branch	Riser	Register		Main	Branch	Riser	Register		Main	Branch	Riser	Register		Main	Branch	Riser	Reg
C.F.M.	550	500	450	300	C.F.M.	550	500	450	300	C.F.M.	550	500	450	300	C.F.M.	550	500	450	300
1	.262	.288	.32	.48	51	13	15	16	24	101	26	29	32	48	151	40	43	48	
2	.524	.576	.64	.96	52	14	15	17	25	102	27	29	33	49	152	40	44	49	
3	.786	.864	.96	1.44	53	14	15	17	25	103	27	30	33	49	153	40	44	49	
4	1.048	1.152	1.28	1.92	54	14	16	17	26	104	27	30	33	50	154	40	44	49	
5	1.31	1.44	1.6	2.40	55	14	16	18	26	105	28	30	34	50	155	41	45	50	
6	2	2	2	3	56	15	16	18	27	106	28	31	34	51	156	41	45	50	
7	2	2	2	3	57	15	16	18	27	107	28	31	34	51	157	41	45	50	
8	2	2	3	4	58	15	17	19	28	108	28	31	35	52	158	41	46	51	
9	2	2	3	4	59	15	17	19	28	109	29	31	35	52	159	42	46	51	
10	3	3	3	5	60	16	17	19	29	110	29	32	35	53	160	42	46	51	
11	3	3	4	5	61	16	18	20	29	111	29	32	36	53	161	42	46	52	
12	3	3	4	6	62	16	18	20	30	112	29	32	36	54	162	42	47	52	
13	3	4	4	6	63	17	18	20	30	113	30	33	36	54	163	43	47	52	
14	4	4	4	7	64	17	18	20	31	114	30	33	36	55	164	43	47	52	
15	4	4	5	7	65	17	19	21	31	115	30	33	37	55	165	43	48	53	
16	4	5	5	8	66	17	19	21	32	116	30	33	37	56	166	43	48	53	
17	4	5	5	8	67	18	19	21	32	117	31	34	37	56	167	44	48	53	
18	5	5	6	9	68	18	20	22	33	118	31	34	38	57	168	44	48	54	
19	5	5	6	9	69	18	20	22	33	119	31	34	38	57	169	44	49	54	
20	5	6	6	10	70	18	20	22	34	120	31	35	38	58	170	45	49	54	
21	6	6	7	10	71	19	20	23	34	121	32	35	39	58	171	45	49	55	
22	6	6	7	11	72	19	21	23	35	122	32	35	39	59	172	45	50	55	
23	6	7	7	11	73	19	21	23	35	123	32	35	39	59	173	45	50	55	
24	6	7	8	12	74	19	21	24	36	124	32	36	40	60	174	46	50	56	
25	7	7	8	12	75	20	22	24	36	125	33	36	40	60	175	46	50	56	
26	7	7	8	12	76	20	22	24	36	126	33	36	40	60	176	46	51	56	
27	7	8	9	13	77	20	22	25	37	127	33	37	41	61	177	46	51	57	
28	7	8	9	13	78	20	22	25	37	128	34	37	41	61	178	47	51	57	
29	8	8	9	14	79	21	23	25	38	129	34	37	41	62	179	47	52	57	
30	8	9	10	14	80	21	23	26	38	130	34	37	42	62	180	47	52	58	
31	8	9	10	15	81	21	23	26	39	131	34	38	42	63	181	47	52	58	
32	8	9	10	15	82	21	24	26	39	132	35	38	42	63	182	48	52	58	
33	9	10	11	16	83	22	24	27	40	133	35	38	43	64	183	48	53	59	
34	9	10	11	16	84	22	24	27	40	134	35	38	43	64	184	48	53	59	
35	9	10	11	17	85	22	24	27	41	135	35	39	43	65	185	48	53	59	
36	9	10	12	17	86	23	25	28	41	136	36	39	44	65	186	49	54	60	
37	10	11	12	18	87	23	25	28	42	137	36	39	44	66	187	49	54	60	
38	10	11	12	18	88	23	25	28	42	138	36	40	44	66	188	49	54	60	
39	10	11	12	19	89	23	26	28	43	139	36	40	44	67	189	50	54	60	
40	10	12	13	19	90	24	26	29	43	140	37	40	45	67	190	50	55	61	
41	11	12	13	20	91	24	26	29	44	141	37	41	45	68	191	50	55	61	
42	11	12	13	20	92	24	26	29	44	142	37	41	45	68	192	50	55	61	
43	11	12	14	21	93	24	27	30	45	143	37	41	46	69	193	51	56	62	
44	12	13	14	21	94	25	27	30	45	144	38	41	46	69	194	51	56	62	
45	12	13	14	22	95	25	27	30	46	145	38	42	46	70	195	51	56	62	
46	12	13	15	22	96	25	28	31	46	146	38	42	47	70	196	51	56	63	
47	12	14	15	23	97	25	28	31	47	147	39	42	47	71	197	52	57	63	
48	13	14	15	23	98	26	28	31	47	148	39	43	47	71	198	52	57	63	
49	13	14	16	24	99	26	29	32	48	149	39	43	48	72	199	52	57	64	
50	13	14	16	24	100	26	29	32	48	150	39	43	48	72	200	52	58	64	

All Main, Branch, Riser and Register Areas given above are in Square Inches of Round Pipe.
 NOTE: Square inch areas above under columns headed "Branch" are also the proper sizes for Return Air Registers and Grilles.

Table K

CROSS SECTIONAL AREAS OF ROUND PIPES

Main	Branch	Riser	Register	Main	Branch	Riser	Register	Diam.	Area	Diam.	Area	Diam.	Area	Diam.	Area	
C.F.M.	550	500	450	300	C.F.M.	550	500	450	300							
201	53	58	64	96	251	66	72	80	120	4.0	12.6	10.3	83.3	16.6	216.4	22.8 408.3
202	53	58	65	97	252	66	73	81	121	4.1	13.2	10.4	84.9	16.7	219.0	22.9 411.9
203	53	58	65	97	253	66	73	81	121	4.2	13.9	10.5	86.6	16.8	221.7	23.0 415.5
204	53	59	65	98	254	67	73	81	122	4.3	14.5	10.6	88.2	16.9	224.3	23.1 419.1
205	54	59	66	98	255	67	73	82	122	4.4	15.2	10.7	89.9	17.0	227.0	23.2 422.7
206	54	59	66	99	256	67	74	82	123	4.5	15.9	10.8	91.6	17.1	229.7	23.3 426.4
207	54	60	66	99	257	67	74	82	123	4.6	16.6	10.9	93.3	17.2	232.4	23.4 430.1
208	54	60	67	100	258	68	74	83	124	4.7	17.3	11.0	95.0	17.3	235.1	23.5 433.7
209	55	60	67	100	259	68	75	83	124	4.8	18.1	11.1	96.8	17.4	237.8	23.6 437.4
210	55	60	67	101	260	68	75	83	125	4.9	18.9	11.2	98.5	17.5	240.5	23.7 441.2
										5.0	19.6	11.3	100.3	17.6	243.3	23.8 444.9
										5.1	20.4	11.4	102.1	17.7	246.1	23.9 448.6
										5.2	21.2	11.5	103.9	17.8	248.8	24.0 452.4
211	55	61	68	101	261	68	75	84	125	5.3	22.1	11.6	105.7	17.9	251.6	24.1 456.2
212	56	61	68	102	262	69	75	84	126	5.4	22.9	11.7	107.5	18.0	254.5	24.2 460.0
213	56	61	68	102	263	69	76	84	126	5.5	23.8	11.8	109.4	18.1	257.3	24.3 463.8
214	56	62	68	103	264	69	76	84	127	5.6	24.6	11.9	111.2	18.2	260.2	24.4 467.6
215	56	62	69	103	265	69	76	85	127	5.7	25.5	12.0	113.1	18.3	263.0	24.5 471.4
216	57	62	69	104	266	70	77	85	128	5.8	26.4	12.1	115.0	18.4	265.9	24.6 475.3
217	57	62	69	104	267	70	77	85	128	5.9	27.3	12.2	116.9	18.5	268.8	24.7 479.2
218	57	63	70	105	268	70	77	86	129	6.0	28.3	12.3	118.8	18.6	271.7	24.8 483.1
219	57	63	70	105	269	70	77	86	129	6.1	29.2	12.4	120.8	18.7	274.6	24.9 487.0
220	58	63	70	106	270	71	78	86	130	6.2	30.2	12.5	122.7	18.8	277.6	25.0 490.9
										6.3	31.2	12.6	124.7	18.9	280.6	25.1 494.8
										6.4	32.2	12.7	126.7	19.0	283.5	25.2 498.8
										6.5	33.2	12.8	128.7	19.1	286.5	25.3 502.7
221	58	64	71	106	271	71	78	87	130	6.6	34.2	12.9	130.7	19.2	289.5	25.4 506.7
222	58	64	71	107	272	71	78	87	131	6.7	35.3	13.0	132.7	19.3	292.6	25.5 510.7
223	58	64	71	107	273	72	79	87	131	6.8	36.3	13.1	134.8	19.4	295.6	25.6 514.7
224	59	65	72	108	274	72	79	88	132	6.9	37.4	13.2	136.8	19.5	298.6	25.7 518.7
225	59	65	72	108	275	72	79	88	132	7.0	38.5	13.3	138.9	19.6	301.7	25.8 522.8
226	59	65	72	108	276	72	79	88	132	7.1	39.6	13.4	141.0	19.7	304.8	25.9 526.9
227	59	65	73	109	277	73	80	89	133	7.2	40.7	13.5	143.1	19.8	307.9	26.0 530.9
228	60	66	73	109	278	73	80	89	133	7.3	41.9	13.6	145.3	19.9	311.0	26.1 535.0
229	60	66	73	110	279	73	80	89	134	7.4	43.0	13.7	147.4	20.0	314.2	26.2 539.1
230	60	66	74	110	280	73	81	90	134	7.5	44.2	13.8	149.6	20.1	317.3	26.3 543.3
										7.6	45.4	13.9	151.7	20.2	320.5	26.4 547.4
										7.7	46.6	14.0	153.9	20.3	323.7	26.5 551.5
										7.8	47.8	14.1	156.1	20.4	326.9	26.6 555.7
231	61	67	74	111	281	74	81	90	135	7.9	49.0	14.2	158.4	20.5	330.1	26.7 559.9
232	61	67	74	111	282	74	81	90	135	8.0	50.3	14.3	160.6	20.6	333.3	26.8 564.1
233	61	67	75	112	283	74	82	91	136	8.1	51.5	14.4	162.9	20.7	336.5	26.9 568.3
234	61	67	75	112	284	74	82	91	136	8.2	52.8	14.5	165.1	20.8	339.8	27.0 572.6
235	62	68	75	113	285	75	82	91	137	8.3	54.1	14.6	167.4	20.9	343.1	27.1 576.8
236	62	68	76	113	286	75	82	92	137	8.4	55.4	14.7	169.7	21.0	346.4	27.2 581.1
237	62	68	76	114	287	75	83	92	138	8.5	56.7	14.8	172.0	21.1	349.7	27.3 585.3
238	62	69	76	114	288	75	83	92	138	8.6	58.1	14.9	174.4	21.2	353.0	27.4 589.6
239	63	69	76	115	289	76	83	92	139	8.7	59.4	15.0	176.7	21.3	356.3	27.5 594.0
240	63	69	77	115	290	76	84	93	139	8.8	60.8	15.1	179.1	21.4	359.7	27.6 598.3
										8.9	62.2	15.2	181.5	21.5	363.1	27.7 602.6
										9.0	63.6	15.3	183.9	21.6	366.4	27.8 607.0
										9.1	65.0	15.4	186.3	21.7	369.8	27.9 611.4
241	63	69	77	116	291	76	84	93	140	9.2	66.5	15.5	188.7	21.8	373.3	28.0 615.8
242	63	70	77	116	292	77	84	93	140	9.3	67.9	15.6	191.1	21.9	376.7	28.1 620.2
243	64	70	78	117	293	77	84	94	141	9.4	69.4	15.7	193.6	22.0	380.1	28.2 624.6
244	64	70	78	117	294	77	85	94	141	9.5	70.9	15.8	196.1	22.1	383.6	28.3 629.0
245	64	71	78	118	295	77	85	94	142	9.6	72.4	15.9	198.6	22.2	387.1	28.4 633.5
246	64	71	79	118	296	78	85	95	142	9.7	73.9	16.0	201.1	22.3	390.6	28.5 637.9
247	65	71	79	119	297	78	86	95	143	9.8	75.4	16.1	203.6	22.4	394.1	28.6 642.4
248	65	71	79	119	298	78	86	95	143	9.9	77.0	16.2	206.1	22.5	397.6	28.7 646.9
249	65	72	80	120	299	78	86	96	144	10.0	78.5	16.3	208.7	22.6	401.2	28.8 651.4
250	66	72	80	120	300	79	86	96	144	10.2	81.7	16.5	213.8	22.7	404.7	28.9 656.0

Refer to Table K at right to obtain the diameter of round pipe required for any area.

Refer to Table L at right to obtain the size of rectangular duct that is equivalent in capacity to round pipe of given diameter.

Table L

**EQUIVALENT ROUND AND RECTANGULAR DUCTS
FOR EQUAL FRICTION**

Side of Rect. Duct	2½	3	3½	4	4½	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19					
DIAMETER OF EQUIVALENT ROUND PIPE																									
8.....	4.7	5.2	5.7	6.1	6.5	6.9	7.6	8.2	8.8																
8½.....	4.9	5.4	5.9	6.3	6.7	7.1	7.8	8.5	9.1	9.6															
9.....	5.0	5.5	6.0	6.5	6.9	7.3	8.0	8.7	9.3	9.9															
9½.....	5.1	5.7	6.2	6.6	7.1	7.5	8.2	8.9	9.6	10.2	10.7														
10.....	5.2	5.8	6.3	6.8	7.2	7.7	8.4	9.2	9.8	10.4	11.0														
10½.....	5.4	5.9	6.5	7.0	7.4	7.8	8.6	9.4	10.0	10.7	11.3	11.8													
11.....	5.5	6.0	6.6	7.1	7.6	8.0	8.8	9.6	10.2	10.9	11.5	12.1	12.6												
11½.....	5.6	6.2	6.7	7.2	7.7	8.2	9.0	9.8	10.5	11.2	11.8	12.4	12.9	13.4											
12.....	5.7	6.3	6.9	7.4	7.9	8.3	9.2	10.0	10.7	11.4	12.0	12.6	13.2	13.7											
12½.....	5.8	6.4	7.0	7.5	8.0	8.5	9.4	10.2	10.9	11.6	12.2	12.9	13.5	14.0											
13.....	5.9	6.5	7.1	7.7	8.2	8.7	9.6	10.4	11.1	11.8	12.5	13.1	13.7	14.3											
13½.....	6.0	6.6	7.3	7.8	8.3	8.8	9.7	10.6	11.3	12.1	12.7	13.4	14.0	14.6	15.1										
14.....	6.1	6.7	7.4	7.9	8.5	8.9	9.9	10.8	11.5	12.3	12.9	13.6	14.3	14.9	15.4										
14½.....	6.2	6.8	7.5	8.1	8.6	9.1	10.1	11.0	11.7	12.5	13.2	13.9	14.5	15.1	15.7	16.2									
15.....	6.3	6.9	7.6	8.2	8.7	9.2	10.2	11.1	11.9	12.7	13.4	14.1	14.7	15.3	16.0	16.5									
15½.....	6.4	7.0	7.7	8.3	8.9	9.4	10.4	11.3	12.1	12.9	13.6	14.3	14.9	15.6	16.2	16.8	17.3								
16.....	7.1	7.8	8.4	9.0	9.5	10.5	11.4	12.3	13.1	13.8	14.5	15.2	15.8	16.5	17.1	17.6									
17.....	7.3	8.1	8.6	9.2	9.8	10.8	11.8	12.6	13.5	14.2	15.0	15.7	16.3	17.0	17.6	18.2	18.7								
18.....	8.2	8.8	9.5	10.0	11.1	12.1	13.0	13.8	14.6	15.4	16.1	16.8	17.4	18.1	18.7	19.2	19.8	19.8	20.4	20.9					
19.....				9.1	9.7	10.3	11.4	12.4	13.3	14.2	15.0	15.8	16.5	17.2	17.9	18.6	19.2	19.8	20.4	20.9					
20.....					10.5	11.6	12.7	13.6	14.5	15.4	16.2	17.0	17.6	18.4	19.0	19.7	20.3	20.9	21.5						
21.....					10.8	11.9	12.9	13.9	14.9	15.7	16.5	17.4	18.0	18.8	19.5	20.1	20.8	21.4	22.0						
22.....					11.0	12.1	13.2	14.2	15.2	16.1	16.9	17.8	18.5	19.2	19.9	20.6	21.3	21.9	22.5						
23.....					11.2	12.4	13.5	14.5	15.5	16.4	17.3	18.1	18.9	19.6	20.4	21.1	21.7	22.4	23.0						
24.....						11.4	12.6	13.8	14.8	15.8	16.8	17.6	18.5	19.3	20.0	20.8	21.5	22.2	22.8	23.5					
25.....						11.6	12.8	14.0	15.1	16.1	17.0	17.9	18.8	19.6	20.4	21.2	21.9	22.6	23.3	24.0					
26.....						11.8	13.1	14.3	15.4	16.4	17.3	18.3	19.2	20.0	20.8	21.6	22.3	23.0	23.8	24.4					
27.....						12.0	13.3	14.5	15.6	16.7	17.6	18.6	19.5	20.4	21.2	22.0	22.7	23.5	24.2	25.0					
28.....							12.2	13.5	14.8	15.9	17.0	18.0	19.0	19.8	20.7	21.5	22.4	23.1	23.9	24.6	25.3				
29.....							12.4	13.7	15.0	16.1	17.2	18.2	19.2	20.2	21.0	21.9	22.7	23.5	24.3	25.0	25.7				
30.....							12.6	13.9	15.2	16.4	17.5	18.5	19.5	20.5	21.4	22.2	23.1	23.9	24.7	25.4	26.2				
31.....							12.7	14.1	15.4	16.6	17.7	18.8	19.8	20.8	21.7	22.5	23.4	24.2	25.0	25.8	26.6				
32.....								12.9	14.3	15.6	16.9	18.0	19.1	20.1	21.1	22.0	22.9	23.8	24.6	25.4	26.2	27.0			
33.....								13.1	14.5	15.8	17.1	18.2	19.3	20.4	21.4	22.3	23.2	24.1	25.0	25.8	26.5	27.3			
34.....								13.2	14.7	16.1	17.3	18.5	19.6	20.7	21.6	22.6	23.5	24.4	25.3	26.2	26.9	27.7			
35.....								13.4	14.9	16.2	17.5	18.7	19.8	20.9	21.9	22.9	23.9	24.7	25.6	26.5	27.2	28.1			
36.....									15.1	16.4	17.7	19.0	20.1	21.2	22.2	23.2	24.2	25.1	26.0	26.8	27.7	28.5			
37.....									15.2	16.6	17.9	19.2	20.3	21.4	22.5	23.5	24.5	25.4	26.3	27.1	28.0	28.8			
38.....									15.4	16.8	18.2	19.4	20.6	21.7	22.8	23.8	24.8	25.8	26.7	27.5	28.4	29.2			
39.....									15.5	17.0	18.4	19.6	20.8	21.9	23.0	24.1	25.1	26.1	27.0	27.8	28.7	29.5			
40.....										15.7	17.2	18.6	19.8	21.1	22.2	23.3	24.4	25.4	26.4	27.3	28.2	29.1	29.9		
41.....										15.9	17.4	18.8	20.0	21.3	22.4	23.5	24.6	25.6	26.6	27.6	28.5	29.4	30.3		
42.....										16.1	17.6	19.0	20.3	21.6	22.7	23.8	24.9	25.9	26.9	27.9	28.8	29.8	30.7		
43.....											17.8	19.2	20.5	21.8	22.9	24.0	25.1	26.2	27.2	28.2	29.1	30.0	30.9	30.9	
44.....											18.0	19.4	20.7	22.0	23.1	24.3	25.4	26.5	27.5	28.5	29.5	30.3	31.2		
45.....											18.2	19.6	20.9	22.2	23.3	24.5	25.6	26.7	27.8	28.8	29.8	30.6	31.5		
46.....											18.4	19.8	21.1	22.4	23.6	24.8	25.9	27.0	28.1	29.1	30.1	31.0	31.9		
47.....											18.6	19.9	21.3	22.6	23.8	25.0	26.1	27.2	28.3	29.3	30.3	31.3	32.2		
48.....												20.1	21.5	22.8	24.1	25.2	26.4	27.5	28.6	29.6	30.5	31.6	32.5		
49.....												20.2	21.7	23.0	24.3	25.4	26.6	27.7	28.9	29.9	30.9	31.9	32.8		
50.....												20.4	21.9	23.2	24.5	25.7	26.9	28.0	29.2	30.3	31.3	32.2	33.1		
51.....												20.6	22.0	23.4	24.7	25.9	27.1	28.2	29.4	30.5	31.5	32.5	33.4		
52.....												20.8	22.2	23.6	24.9	26.2	27.4	28.5	29.6	30.7	31.8	32.9	33.8		
53.....												20.9	22.4	23.8	25.1	26.4	27.6	28.7	29.8	30.9	32.0	33.1	34.1		
54.....												21.1	22.6	24.0	25.3	26.6	27.8	29.0	30.1	31.2	32.3	33.4	34.4		
55.....												21.3	22.7	24.2	25.5	26.8	28.0	29.2	30.3	31.4	32.5	33.6	34.6		

DUCT SYSTEMS AND DESIGN

Duct systems may be of two types. The system may be either an individual pipe system in which separate pipes lead from the heating chamber to each register and from each return air register or grille to the blower compartment, or trunk lines may be used in which a main duct will attach to the unit and two or more heat pipes (branches) will lead to or from the ducts to grilles or registers.

INDIVIDUAL PIPE SYSTEMS

The design of this type of system is quite simple and is sometimes used for certain small jobs, and for some replacement jobs where a gravity system is to be replaced.

The sizes of pipe, registers and risers are obtained from Tables I and J, page 7, after the total C. F. M. has been computed in accordance with the Sunbeam Data Sheet, for the Warm Air side of the system.

Locking Type Dampers must be placed in each warm air pipe as close to the unit as possible unless friction dampers in stack heads are used.

RETURN AIR SIDE OF SYSTEM

Return air may be taken from each room except bath rooms and kitchens, or two or more grilles can be placed in various points of vantage.

Under the heading "Return Air Intakes", Tables "I" and "J" are given the proper size of intakes (grilles or registers) to use for any given amount of C. F. M. The total return air pipe area for the system must be not less than the total warm air pipe area.

If it is not practical to have a return air intake from each room, make a total of the C. F. M. for any number of rooms to be grouped on one return air line and select an intake of the proper size from Table I or J.

Example: Bath room, hall and entry are grouped on one return in our sample plan (page 15). Bath room has 94 C. F. M., hall has 78 C. F. M. and entry has 57 C. F. M., making a total of 229 C. F. M. which requires a 24" x 6" intake and a 9" pipe (Table I, page 7) or a 30" x 6" intake (Table J, page 7) and a basement duct area of 60 sq. in. (Area Chart, pages 8 and 9).

If a 24" x 6" intake is required a 24" x 3 $\frac{1}{4}$ " riser should be used, or two stud spaces. If the 30" x 6" intake is used two stud spaces (376 C. F. M. maximum capacity) must be used, or 2—3 $\frac{1}{4}$ " x 12" risers, which will accommodate 300 C. F. M. For intakes up to 14" wide use one stud space or a riser 3 $\frac{1}{4}$ " deep and the width of the intake. For widths greater than 14", use two stud spaces, or two risers 3 $\frac{1}{4}$ " deep.

If the total C. F. M. for any group of rooms is greater than appears on Table I, refer to the Area Chart on pages 8 and 9, and select the C. F. M. total which is to be supplied. The figure in the second column marked "branch" represents the square inch free area the intake and basement duct must have.

Return air intakes from bedrooms must be registers with louvers, and not grilles which have no louvers. All other intakes may be grilles.

Bath rooms should be vented (the air is exhausted or discharged into attic space) and a grille selected on the basis of the C. F. M. figured for the room and a grille and riser selected from the return air columns in Table I or J (page 7). Stud spaces on inside walls may be used as risers if desired and if your local Building Code permits. Vent grilles are to be placed at floor line.

Sealed joist spaces may be used as return air ducts if the ducts run parallel with the joists and if the spaces have an area equal to or greater than the area of the duct required.

When several rooms are grouped on one return air intake, provision must be made for recirculation by allowing the doors between rooms to stand ajar, or by providing a 1" clearance under all doors leading to the room containing the return air grille.

Locking type Dampers must be placed in each return air pipe as close to the unit as practical.

TRUNK LINE DESIGN

Trunk line systems are more difficult to design and require more care and study than individual duct systems. The following method is to be followed in designing trunk line systems.

CONVENTIONAL METHOD — *Warm Air*

For designing trunk line systems reference should be made to the Area Chart, pages 8 and 9, and the following methods adopted:

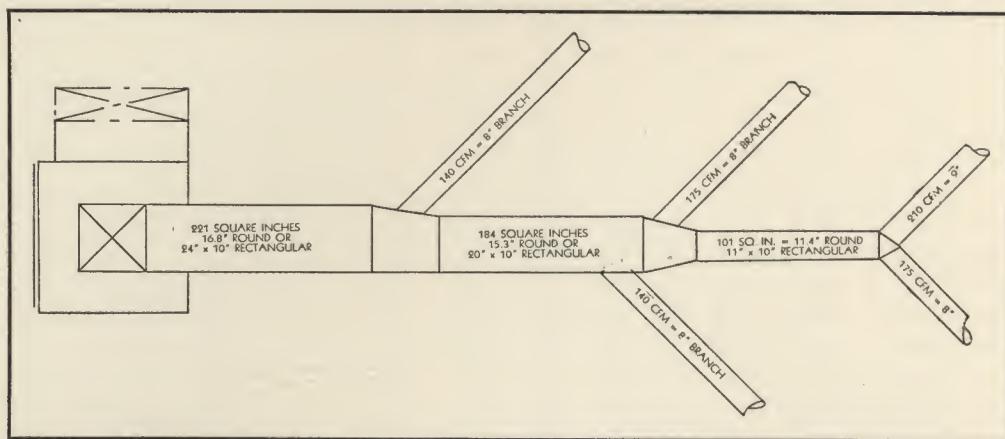
After the C.F.M. has been figured in accordance with the Sunbeam Data Sheet for all rooms, the register sizes and locations should be noted on the plan using Table I (page 7).

If register proportions other than those appearing in Table I are desired, convert C.F.M. to square inches using Area Chart on pages 8 and 9, and select registers and risers that will have the square inch free areas specified.

If heat registers are to be placed high up in the walls, higher velocities (500 F. P. M.) through registers and risers should be used. In installations of this type use the "Branch" (500 F.P.M.) area in Area Chart on Pages 8 and 9 as the size for risers and registers (free area in square inches) and refer to register catalog. Size may also be obtained from Table "I", column headed "Return Air Intakes."

After selecting the register locations a rough sketch or outline of the duct system should be made, and the data as to C.F.M. and sizes noted thereon after which they can be transferred to the plans.

From the column headed "Main" on the Area Chart, pages 8 and 9, select the square inch free areas required by the rooms which the main duct is to serve and make a total of the square inches which will give you the area (in round pipe) of the duct as it attaches to the plenum chamber.



AREAS OF RECTANGULAR DUCTS — Areas of ducts as determined in the "Area Chart" are for round pipes. Should rectangular ducts be used, the dimensions should be determined from the table "L" of "Equivalent Round and Rectangular Ducts for Equal Friction" (pages 9 and 10.)

For example: The illustration above shows a main duct supplying five branches. Starting at the farthest end from the unit we have a branch of 210 C.F.M. which requires a 9" branch, and 175 C.F.M. which requires an 8" branch. Next add 140 C.F.M. which is another 8" branch; and 175 C.F.M. which requires another 8" branch according to Table I. Now refer to the Area Chart and you will find that for 210 C. F. M. the main duct area is 55 square inches; 175 C.F.M.—46 square inches; 140 C.F.M.—37 square inches; 175 C.F.M.—46 square inches; 140 C.F.M.—37 square inches, making a total requirement of 221 square inches ($55+46+37+46+37$) for the main duct where it attaches to the plenum chamber. This area is for a round pipe having a diameter of 16.8 inches (see Table "K"—cross sectional areas for round pipe, page 9) and represents the size of round pipe that would be required.

To obtain the proper size of rectangular duct having equal friction, refer to Table "L"—Equivalent Round and Rectangular Ducts for equal friction, page 10. Assume that your main duct is to be 10" deep. At the top of the table select the column headed 10" and follow down to the figure 16.8 which represents the diameter of the round pipe and then across to the extreme left column headed "Side of Rectangular Duct" and you will obtain 24". The duct will then be 10" deep and 24" wide for the main duct where it attaches to the plenum if a rectangular duct is used.

After the first branch (37 square inches) has been taken off the main duct, the next section will require 221 square inches less 37 square inches or 184 square inches which Table K on page 9 shows would be a 15.3 inch round pipe, or by reference to the equivalent area chart, a 20"x10" rectangular duct.

After the next two branches are taken off, there are but two branches left requiring a main duct area of 55 square inches and 46 square inches, or 101 square inches. This would be equivalent to an 11.4 inch diameter round pipe (page 9, Table K) or an 11"x10" rectangular duct.

With a rectangular trunk line system either round or rectangular branches may be used. The sizes of round branches may be selected from Table I, page 7. Rectangular branch sizes may be obtained by reference to Tables "K" and "L", pages 9 and 10. Round pipe of standard commercial sizes are used as they are less expensive than odd diameter sizes of pipe made specially for the exact areas required.

Dampers of the locking type must be placed in each branch close to the trunk line, unless friction dampers are used in the stack heads, to regulate the air flow. A Locking type Damper must be installed also in each warm air trunk line close to the unit.

Upon checking the area of the round pipe given in Table I against the C.F.M. figured, and against the "branch" areas on the Area Chart, it will be found that some of the C.F.M. figures listed under 6" pipe, could be supplied with much smaller pipes. However, we do not recommend the use of any pipe smaller than 6" in diameter and for that reason a 6" diameter pipe is the smallest size shown.

CONVENTIONAL METHOD — Return Air Ducts

Return air ducts should be brought back from as many rooms as possible, kitchens and bath rooms excepted, and care should be taken to withdraw from each room or series of inter-communicating rooms, air equivalent to the amount delivered to the room or series of inter-communicating rooms.

For return air register or grille sizes refer to Table I, page 7. The next step will be to locate return air intakes (register or grille).

If registers and grilles of other proportions than those appearing in Table I (Page 7) are desired, convert C.F.M. into square inches using Area Chart on Pages 8 and 9, heading "Branch", and select register or grille from the square inch free areas specified.

In designing return air trunk systems the same procedure as for the warm air side of the system may be followed.

Sealed joist spaces may be used as return air ducts if the ducts run parallel with the joists and if the spaces have an area equal to or greater than the area of the duct required. After dropping out of joist spaces into cross joist ducts do not raise return air back into joist spaces.

Bath rooms should be vented (the air is exhausted or discharged into attic space) and the grille selected on the basis of the C.F.M. figured for the room. (Select grille and riser sizes from Return Air column in Table I, page 7.) Stud spaces on inside walls may be used as risers if desired and if your local Building Code permits. Vent grilles are to be placed at floor line.

Recirculation of air from any room in which no return air register or grille has been placed must either be provided by not less than 1" clearance beneath the door or the door left ajar.

Locking type Dampers must be placed in each branch close to the trunk line, to regulate the recirculating air flow.

SIMPLIFIED DUCT SCHEDULE — Warm Air

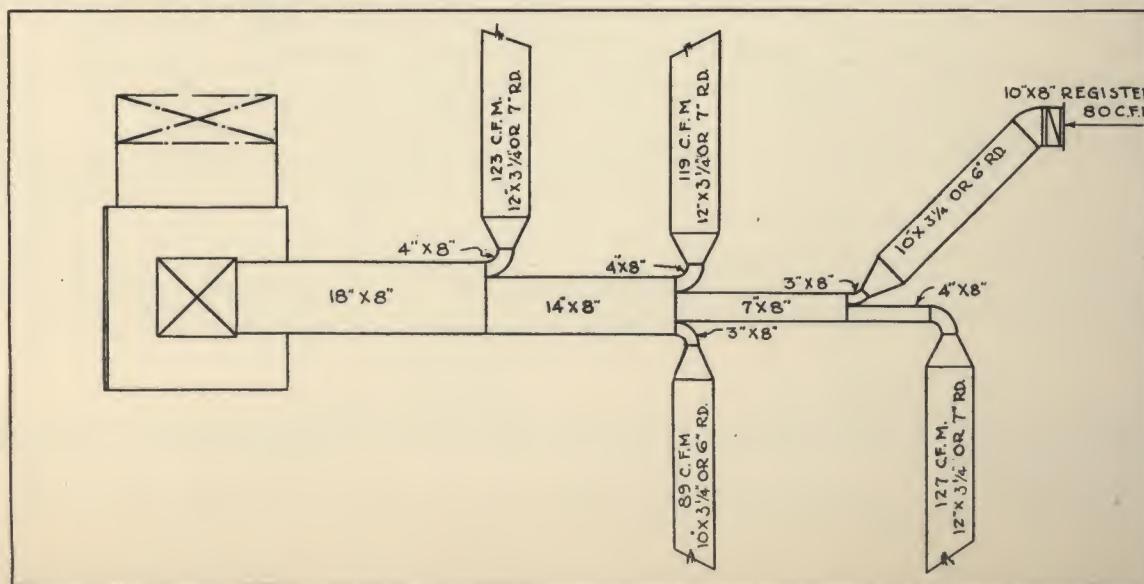
Below is the explanation of how Table "J", page 7, "Simplified Duct and Register Schedule", is applied in obtaining the size of a trunk line.

Standardize on a trunk line 8" deep. Obtain the C. F. M. for the branch **most distant** from the Air Conditioner. In the sketch below this branch handles 127 C. F. M. By referring to Table "J", page 7, note that the branch size is 12" x 3 1/4" (or 7" round); the take-off from trunk line is 4" x 8"; and a space 4" wide x 8" high is required in the trunk line, up to the point where the branch "takes off".

By referring to the sketch below the next branch connected to the trunk requires a 10" x 3 1/4" (or 6" round) branch; a 3" x 8" "take-off"; and a space 3" x 8" in the trunk line. Therefore, in order to have capacity for the two final branches, the trunk line must be 4" (x 8") plus 3" (x 8") or 7" x 8" in size.

As branches requiring 98 or less C. F. M. (Table J, page 7) connect to the trunk, the standardized 8" deep main duct is made 3" wider; and as branches requiring 99 to 128 C. F. M. (Table J, page 7) connect the trunk is made 4" wider.

Accordingly, as shown in the sketch below, where the next two branches join the trunk, it is widened 3" to supply the branch at the bottom (89 C. F. M.) and 4" to supply the branch at the top (119 C. F. M.), or a total of 7" in width for these two branches. This 7" (by 8" deep) added to the 7" x 8" trunk needed for the last two branches requires a main duct 14" x 8" for the four branches. Since the branch nearest the unit (123 C. F. M.) requires 4" x 8" of trunk line, the main duct at the connection to the plenum chamber is 4" (x 8") added to 14" (x 8") or a trunk line 18" x 8".



SIMPLIFIED DUCT SCHEDULE — Return Air

The return air system will be designed in conformance with the data given under "Return Air" heading of Table "J", page 7.

Referring to the sample Data Sheet, below, the living room calls for 194 C. F. M. Table "J" page 7 will show that a 12" x 8" register will be required. The dining room calls for 180 C. F. M. (kitchen included) and we find, by referring to Table "J", that a 12" x 8" register can be used as it has a capacity of 213 C. F. M. (30" x 6" grilles could be used in both rooms if desired).

Now refer to the basement plan and we will determine the size of main duct required to serve these two rooms. The dining room requires 180 C. F. M. which, according to the Area Chart (pages 8 and 9), will necessitate a duct area of 47 square inches. The living room duct will be sized for 194 C. F. M., or 51 square inches. 47 Square inches plus 51 square inches = 98 square inches. Since a standardized 8" depth is as desirable for return air trunk lines as for warm air trunk lines, a duct 8" deep and 13" wide will provide the necessary 98 square inches.

The same procedure is followed for any other return air trunk lines in the system.

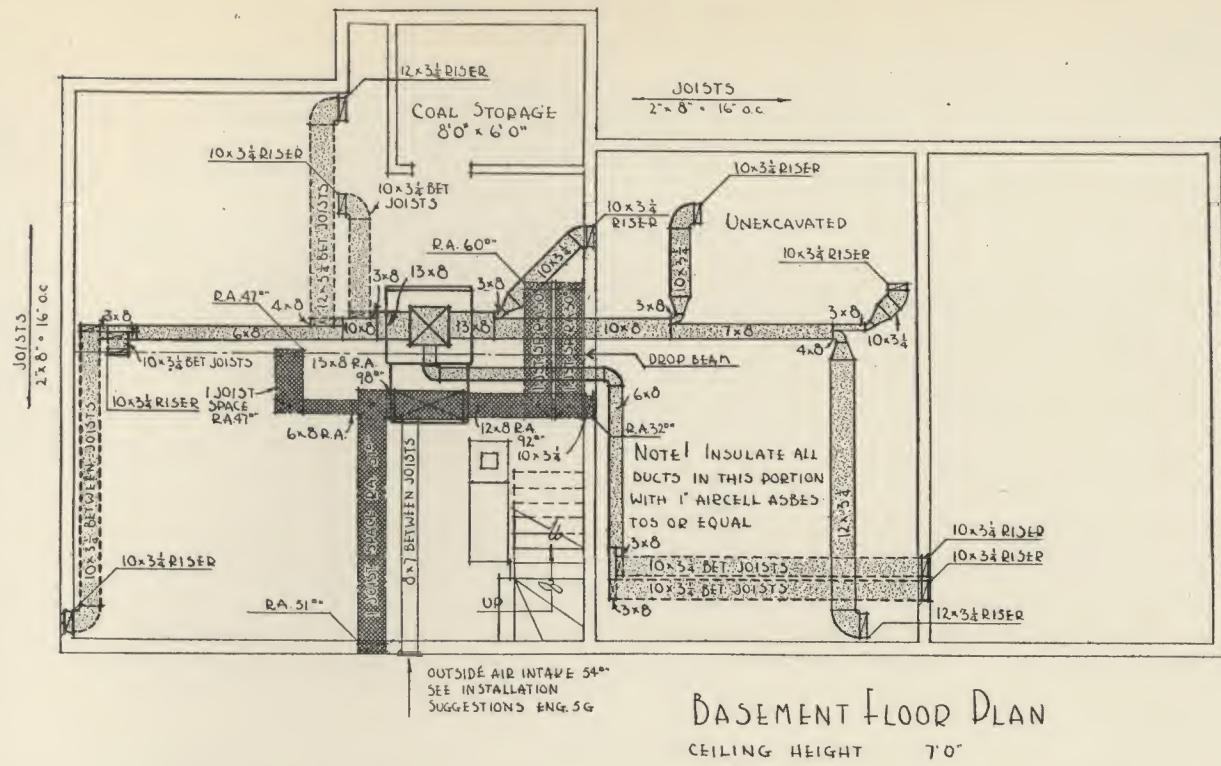
SUNBEAM AIR CONDITIONING DATA SHEET

Name	Street						City							
Heating Contractor							Date	Job No.						
Unit No.	Capacity at Register 95,000						Fuel	COAL	HAND FIRED					
ROOMS	LIVING ROOM	DINING ROOM	KITCHEN	ENTRY	HALL	BATH	BED ROOM	GARAGE						TOTAL CUBICS
CUBICS	1836	1029	1105	187	638	425	1182	2142						8544
	FACTORS													
	Construction No.	Garage	Living Room	Bath	EXPOSURE C.F.M.	EXPOSURE C.F.M.	EXPOSURE C.F.M.	EXPOSURE C.F.M.	EXPOSURE C.F.M.	EXPOSURE C.F.M.	EXPOSURE C.F.M.	EXPOSURE C.F.M.	EXPOSURE C.F.M.	
INFILTRATION	1A	.71	.69	1.01	19	13	14	10	20	23	20	23	14	14
TOTAL EXPOSED WALL					255	187	149	34	47	123	187	383		
GLASS	2	.66	1.09	1.61	66	72	30	33	6	7	21	23	8	13
NET WALL	14	.12	.19	.28	189	36	157	30	143	27	15	2	26	5
FLOOR	*60.61	.09	.39	.28	-	-	-	*16	6	22	4	52	10	50
CEILING	66	.14	.19	.28										
SUB-TOTAL C. F. M.					187	100	76	56	.76	90	116	167		
DUCT LOSS—See page 3		4%	7	2%	2	2%	2	2%	1	2%	2	4%	4	5%
TOTAL C. F. M. FOR 150° REG TEMP		194	102	78	57	78	94	122		177				
TOTAL C. F. M. FOR ____ REG. TEMP.														
HEAT PIPE REQUIRED		2.3x8	4x8	3x8	3x8	3x8	3x8	4x8	2.3x8					
RISER REQUIRED		2.10x3 $\frac{1}{4}$	12x3 $\frac{1}{4}$	10x3 $\frac{1}{4}$	10x3 $\frac{1}{4}$	10x3 $\frac{1}{4}$	10x3 $\frac{1}{4}$	12x3 $\frac{1}{4}$	2.10x3 $\frac{1}{4}$					
REGISTER REQUIRED		2.10x8	12x8	10x8	10x8	10x8	10x8	12x8	2.10x8					
RETURN AIR DUCT REQUIRED		51"	47"	INCLUDED	INCLUDED	60"	INCLUDED	32"						
RETURN AIR RISER		51"	47"	IN	IN	60"	IN	32"						
RETURN AIR INTAKE		12x8	12x8	DIN. RM.	HALL	30x6	HALL	10x6						
SUB-TOTAL C. F. M. FOR ALL ROOMS														868
SUB-TOTAL C. F. M. FOR BATHS (HEAT FOR OUTSIDE AIR WHEN NEEDED)														90
SUB-TOTAL C. F. M. FOR GARAGES (HEAT FOR OUTSIDE AIR WHEN NEEDED)														167
Wall Construction	BRICK VENEER AND $\frac{1}{2}$ " RIGID INSULATION FOR LATH						Windows	WOOD, DOUBLE HUNG						80,617
Roof and Ceiling Construction	$\frac{1}{2}$ " RIGID INSULATION & PLASTER, ATTIC UNFLOORED & NOT VENTILATED						Floors	DOUBLE FLOOR ON JOIST NO CEILING BELOW						TOTAL BTU Select size of Unit from above Total BTU

The layout on the opposite page (15) is designed for a brick veneer building with $\frac{1}{2}$ " rigid insulation for lath, to be heated to 70° (bath room 85° and garage 50°) with an outside temperature of zero. The ceiling of this building is $\frac{1}{2}$ " insulating lath and plaster and the attic is unfloored and unventilated.

The factors used are Nos. 1 and 1A for Infiltration, No. 2 for Glass, No. 14 for walls, No. 73 for ceiling and Nos. 60, 61 and 66 for floors. Table "E" is used, as the outside temperature to be provided for is zero.

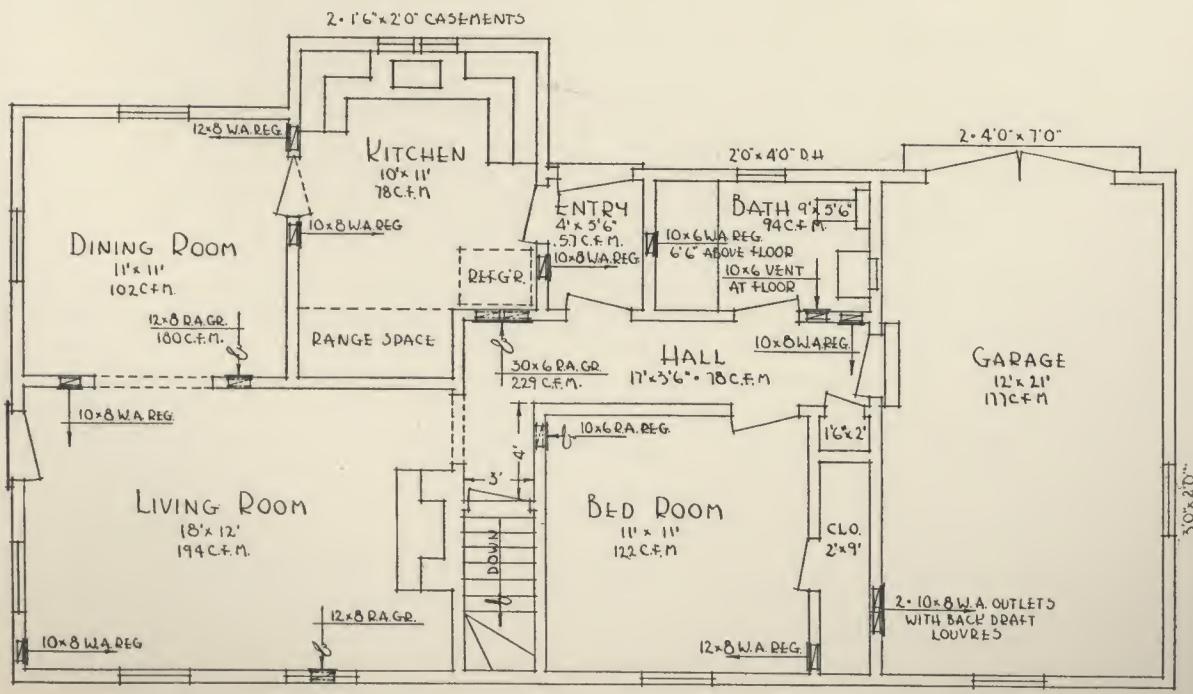
SAMPLE AIR CONDITIONING LAYOUT



BASEMENT FLOOR PLAN
CEILING HEIGHT 7' 0"

THIS SYSTEM IS DESIGNED TO USE RECTANGULAR
BRANCHES.
IF ROUND PIPE BRANCHES ARE DESIRED USE THE
FOLLOWING SCHEDULE.

<u>Round Branch</u>	<u>Rectangular Branch</u>	<u>Trunk Line Take-off</u>
6"	3½" x 10"	3" x 8"
7"	3½" x 12"	4" x 8"
8"	3½" x 14"	5" x 8"



ALL WINDOWS ARE 3'0" X 5'0" D.H. EXCEPT
AS NOTED • • • OUTSIDE DOORS ARE
3'0" X 7'0" • •

FIRST FLOOR PLAN
CEILING HEIGHT 8' 6"

SUGGESTIONS FOR AVOIDING HIGH RESISTANCE IN DUCTS

Care should be taken to avoid runs having an unusual amount of resistance. Bear in mind that the resistance in all runs may have to be increased by dampering to equal the resistance in the most difficult run in order to have a well-balanced system. If one run has an unusual amount of resistance, making it necessary to damper all other runs, more power will be consumed by the motor; the speed of the fan will have to be increased to offset the increased friction set up by dampering and possibly a larger motor might be necessary. If, after laying out the system, it appears as though there are one or more runs with unusual resistance they should be redrawn, if possible, to eliminate tortuous turns. If it is not possible to eliminate such winding turns, add 25% above normal to the sizes of these particular runs to reduce resistance.

INSULATION

Heat pipes exposed to chilling surfaces such as windows or cold walls, and heat pipes which extend into cooler portions of the heater room or basement, must be insulated with not less than $\frac{1}{2}$ " Aircell asbestos or equal.

Warm air pipes in unheated basement rooms must be insulated with $\frac{1}{2}$ inch Aircell asbestos or equal.

Heat pipes in unexcavated spaces must be insulated with 1 inch of Aircell asbestos or equal.

Heat pipes in garages or attics must be insulated with 1 inch of Aircell asbestos or equal.

Warm air risers in outside walls must be insulated with $\frac{1}{2}$ inch Aircell asbestos or equal.

Walls adjoining garages are to be considered as outside walls and heat pipes in these walls must be insulated.

VENTS—Arrangements should be made to have all foundation and attic vents closed during heating season.

DESIGNING FOR LOWER REGISTER TEMPERATURES

(To give 5 air changes per hour as recommended by the "Technical Code for the Design and Installation of Mechanical Warm Air Heating Systems," published by the National Warm Air Heating and Air Conditioning Association.)

A system designed on the basis of the data thus far given provides for a register temperature of approximately 150°, which we have found will give satisfactory heating results but does not provide for any predetermined number of air changes.

The "Technical Code for the Design and Installation of Mechanical Warm Air Heating Systems" recommends a minimum of 5 air changes an hour and, if the system is to meet the "Code" requirements, the volume of air provided by the system must be such that this number of air changes will be obtained.

In order to obtain a greater number of air changes than provided at 150° register temperature, it is necessary to pass more air through the system which will result in **LOWER register temperatures**. Well insulated homes frequently call for this arrangement.

After the Sunbeam Data Sheet has been figured in the regular manner, the following steps will convert the system over to lower register temperatures, and consequently to an increased air volume.

1. Divide the cubic foot contents of the building by 12, if 5 air changes are desired, (or by 15, if 4 air changes are desired). This division gives the C. F. M. required for the desired number of air changes.
2. Divide the C. F. M. required for increased air volume, by the total C. F. M. on the Sunbeam Data Sheet (duct loss included). This will give the percent of C. F. M. required.
3. Refer to Table 1 (next page) and select the living room Correction Factor nearest to the figure obtained in paragraph No. 2 above. Note that different Correction Factors are required for bath rooms and garages. Also, note the resulting decreased register temperature on Table 1.
4. Multiply the total C. F. M. of each room, as shown on the Sunbeam Data Sheet for 150° register temperature, by the Correction Factors obtained from Table 1 and place the results in the C. F. M. line provided in Sunbeam Data Sheet. A system designed on the basis of this C. F. M. will provide the approximate number of desired air changes at the lower register temperature.
5. A system designed for other than 150° register temperature will necessitate the use of different Compensating Factors, for bath room and garage heating, other than those given on page 3. From Table 2 on opposite page the correct compensating factors for these Lower Register Temperatures — from 145° to 120° — can be obtained.

Example: Assume that you are figuring a building having a cubic content of 16000 cubic feet. At 150 degree register temperature, 1000 C. F. M. has been obtained, with the Sunbeam Data Sheet figured in the regular manner. The system is to be installed in a climate where it is customary to figure an outside temperature of 10 degrees below zero. You desire in this building to obtain 5 air changes per hour to comply with the Code.

1. $16000 \div 12 = 1333$ C. F. M. required for 5 air changes.
2. $1333 \div 1000 = 1.33$ percent of C. F. M. required.
3. Reference to Table No. 1 on the opposite page shows the living room Correction Factor nearest to 1.33 to be 1.36, with companion Factors of 1.49 for the bath rooms and 1.28 for the garage. The resulting register temperature would be approximately 125 degrees.
4. The C. F. M. of each living room would then be multiplied by 1.36, the garage by 1.28 and the bath rooms by 1.49 and the results placed in the C. F. M. column provided on the Sunbeam Data Sheet.
5. Since the system will be designed for 125 degrees at the register and the outside temperature is 10 degrees below zero, the sub-total C. F. M. (on sub-total line of Sunbeam Data Sheet) for the garage will then be multiplied by 89 and the bath room by 30 in adding for ventilation. (See Table No. 2 on the opposite page.)

$$\left(\frac{\text{Total CFM} \times 60}{\text{Cubics}} = \text{No. air changes Per Hour} \right)^{16}$$

Table No. 1

When, in order to obtain 5 air changes per hour, it is necessary to increase air volume and consequently to lower the register temperature, use the following

CORRECTION FACTORS

To determine Air Volume (C. F. M.) and resulting register temperature

1.05	1.07	1.04	1.12	1.15	1.09	1.18	1.24	1.15	1.27	1.35	1.21	1.36	1.49	1.28	1.47	1.66	1.36
Living Room 70°	Baths 85°	Garage 50°	Living Room 70°	Baths 85°	Garage 50°	Living Room 70°	Baths 85°	Garage 50°	Living Room 70°	Baths 85°	Garage 50°	Living Room 70°	Baths 85°	Garage 50°	Living Room 70°	Baths 85°	Garage 50°
145° Reg. Temp.	140° Reg. Temp.	135° Reg. Temp.	130° Reg. Temp.	125° Reg. Temp.	120° Reg. Temp.												

Note—Multiply the C. F. M. (figured in the regular manner) for each room by the proper number, in bold faced type above, to determine the increased C. F. M. required to provide 5 air changes per hour for each room. The increased C. F. M. will, of course, increase the amount of area required in the ducts and registers supplying each room.

Table No. 2

ONLY WHEN AN OUTSIDE AIR DUCT is connected to the system, and the Air Volume has been increased in order to provide 5 air changes per hour, use these

COMPENSATING FACTORS

To convert C. F. M. to B. T. U.

Outside Air Temp.	145° Reg. Temp.		140° Reg. Temp.		135° Reg. Temp.		130° Reg. Temp.		125° Reg. Temp.		120° Reg. Temp.	
	Garage	Bath										
+30°	34	3	35	4	36	6	37	8	39	10	41	13
+20°	43	6	45	8	47	10	49	12	52	15	54	19
+10°	53	10	56	12	58	14	61	17	64	20	68	24
0	63	13	66	15	69	18	73	21	77	25	81	30
-10°	73	16	76	19	80	22	84	25	89	30	94	35
-20°	83	20	87	23	91	26	96	30	102	34	108	41
-30°	93	23	97	26	102	30	108	34	114	39	121	46

Note—Refer to this Table No. 2 only when an **outside air duct** is connected to the system and when heating capacity, to heat the **outside air** drawn in through this duct, must be provided for. When it is necessary to increase the C. F. M. of a system designed on the basis of 150° register temperature, in order to provide 5 air changes per hour, more air will be handled through the system. Therefore, **more cold air** will be drawn in through an **outside air duct**. Accordingly, **more heat, more Btu**, will be required to raise the temperature of this **increased volume of cold outside air**.

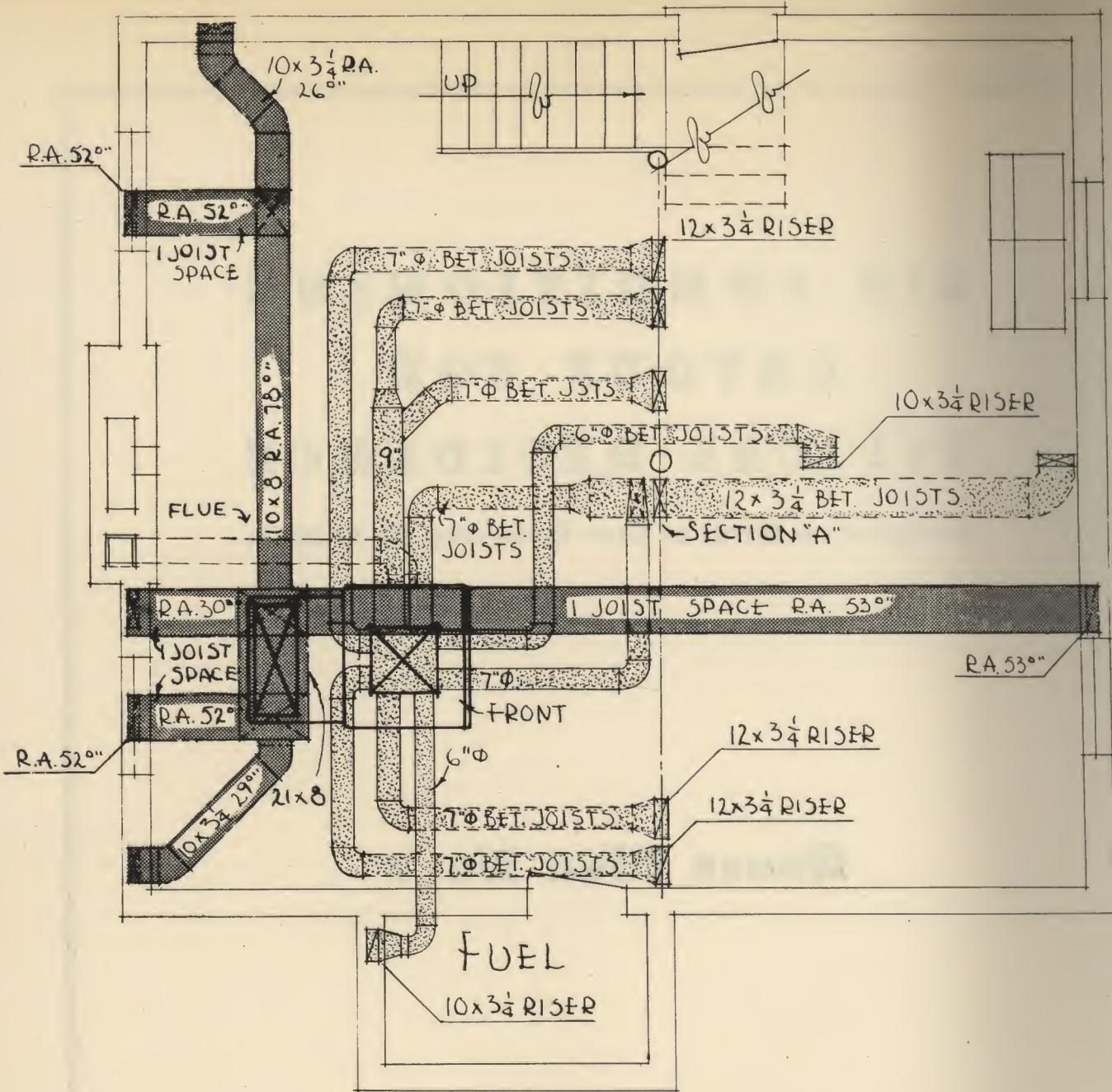
By multiplying the garage or bath room C. F. M. by the proper factor, in table above, you will obtain the amount of Btu required to heat any outside air drawn in through outside air duct in order to replace air exhausted or vented from garages or bath rooms. If Table No. 1 above reveals that this system will operate at a register temperature of 125°, select factors in Table No. 2 from the column headed "125° Reg. Temp."

AIR CONDITIONING LAYOUT FOR TYPICAL RESIDENCE

Designed on Basis of Zero Outdoors, 70° Indoors

House Plan No. 2

**THE FOX FURNACE COMPANY
ELYRIA, OHIO**

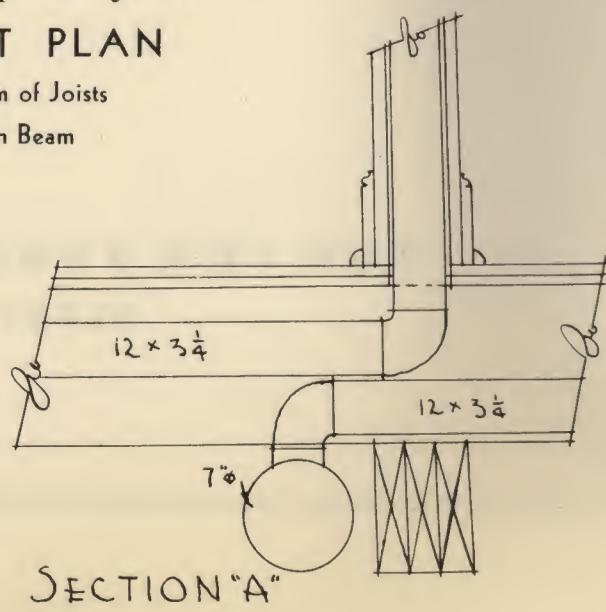
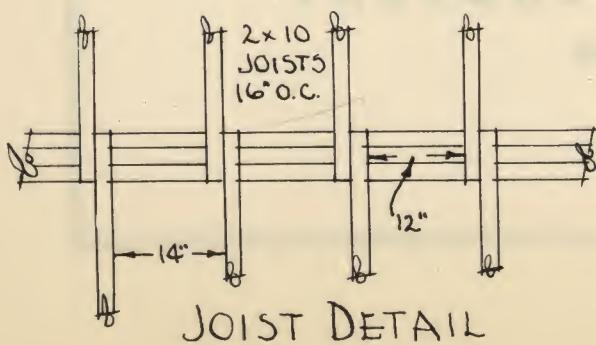


Individual Pipe Layout

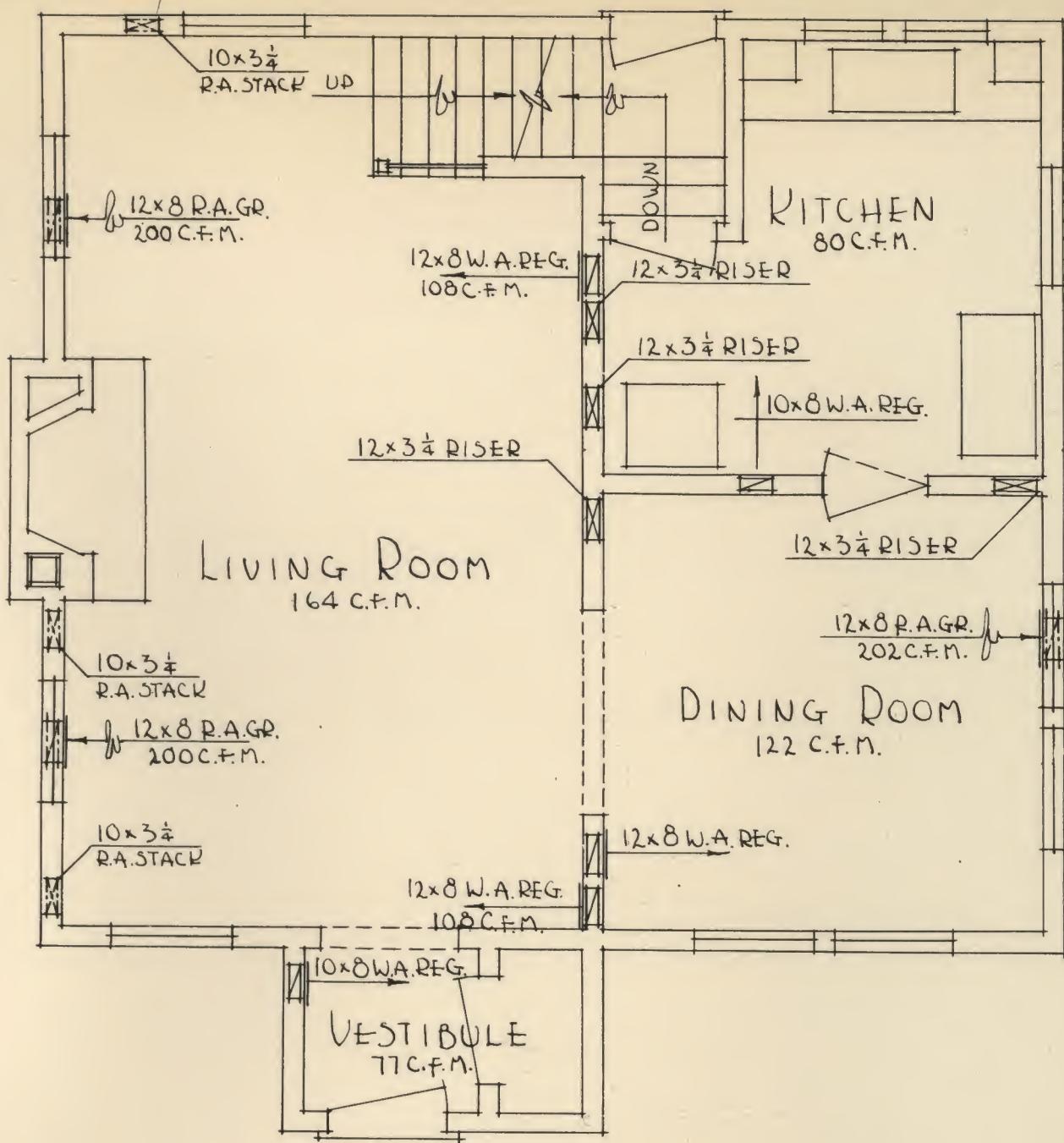
BASEMENT PLAN

7'-6" to Bottom of Joists

Joists rest on Beam



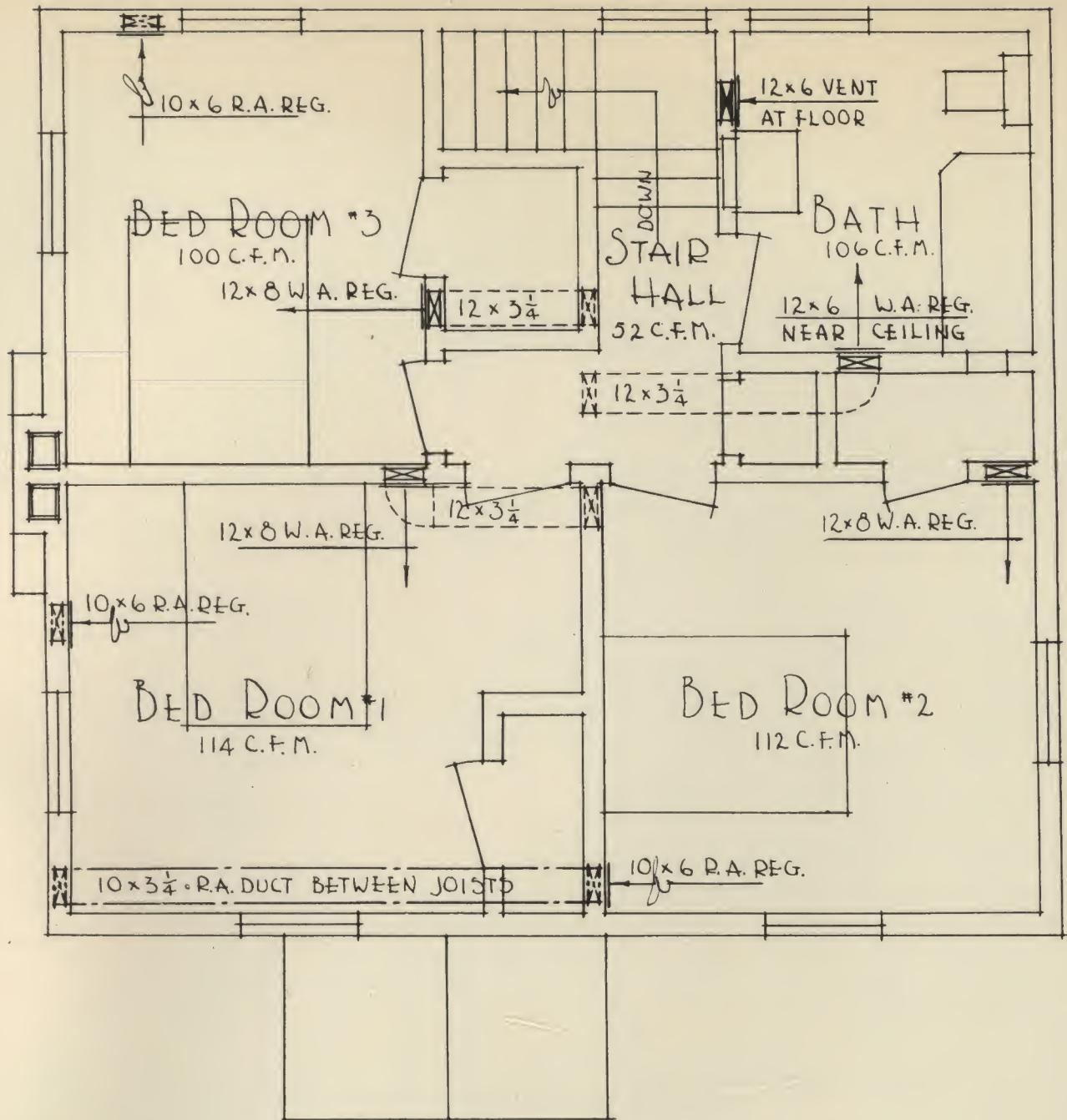
SECTION "A"



FIRST FLOOR PLAN

8'-0" Ceiling

SUNBEAM
AIR CONDITIONING



SECOND FLOOR PLAN

8'-0" Ceiling

Scale $\frac{1}{4}$ " to the Foot

BUILDING CONSTRUCTION

WALLS:- Standard Frame - Siding, Sheathing, Studs, Lath and Plaster.

CEILING:- $\frac{1}{2}$ " Rigid Insulation - Attic Unfloored and Unventilated.

FLOORS:- Double Floors on Joists, no Ceiling Below.

WINDOWS:- Wood, Double Hung.

Elyria, Ohio
THE FOX FURNACE COMPANY

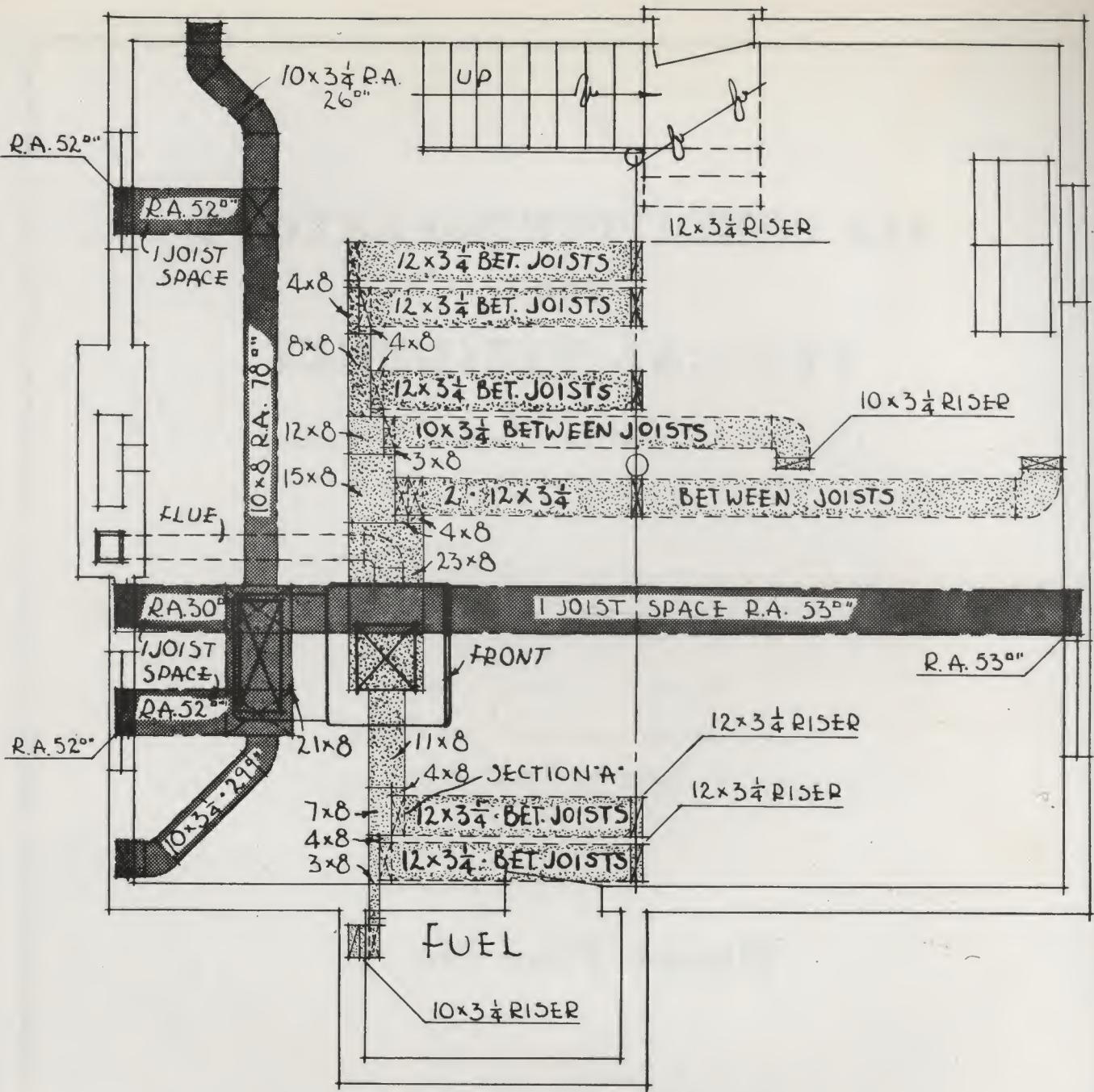
HOUSE PLAN No. 2

1—Conventional Trunk Line System
2—Extended Plenum System
Basement Layouts Showing

HOUSE PLAN No. 2

Designed on Basis of Zero Outdoors, 70° Indoors

TYPICAL RESIDENCE
for
AIR CONDITIONING LAYOUT

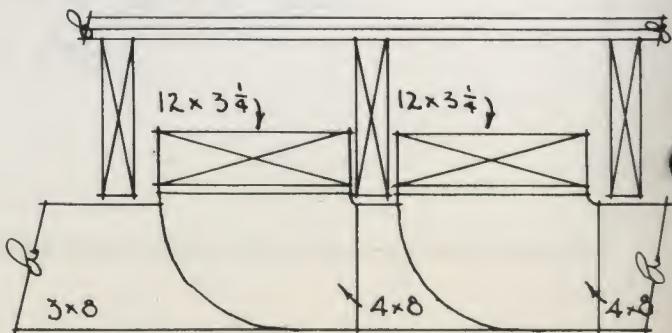
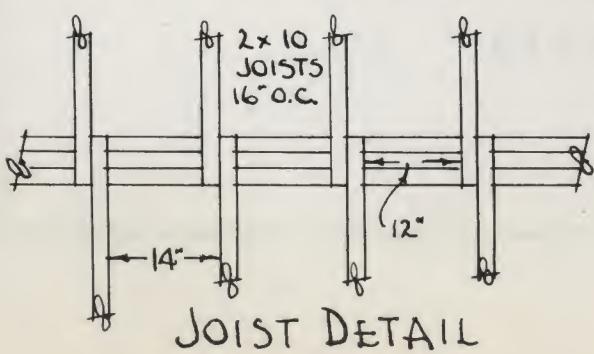


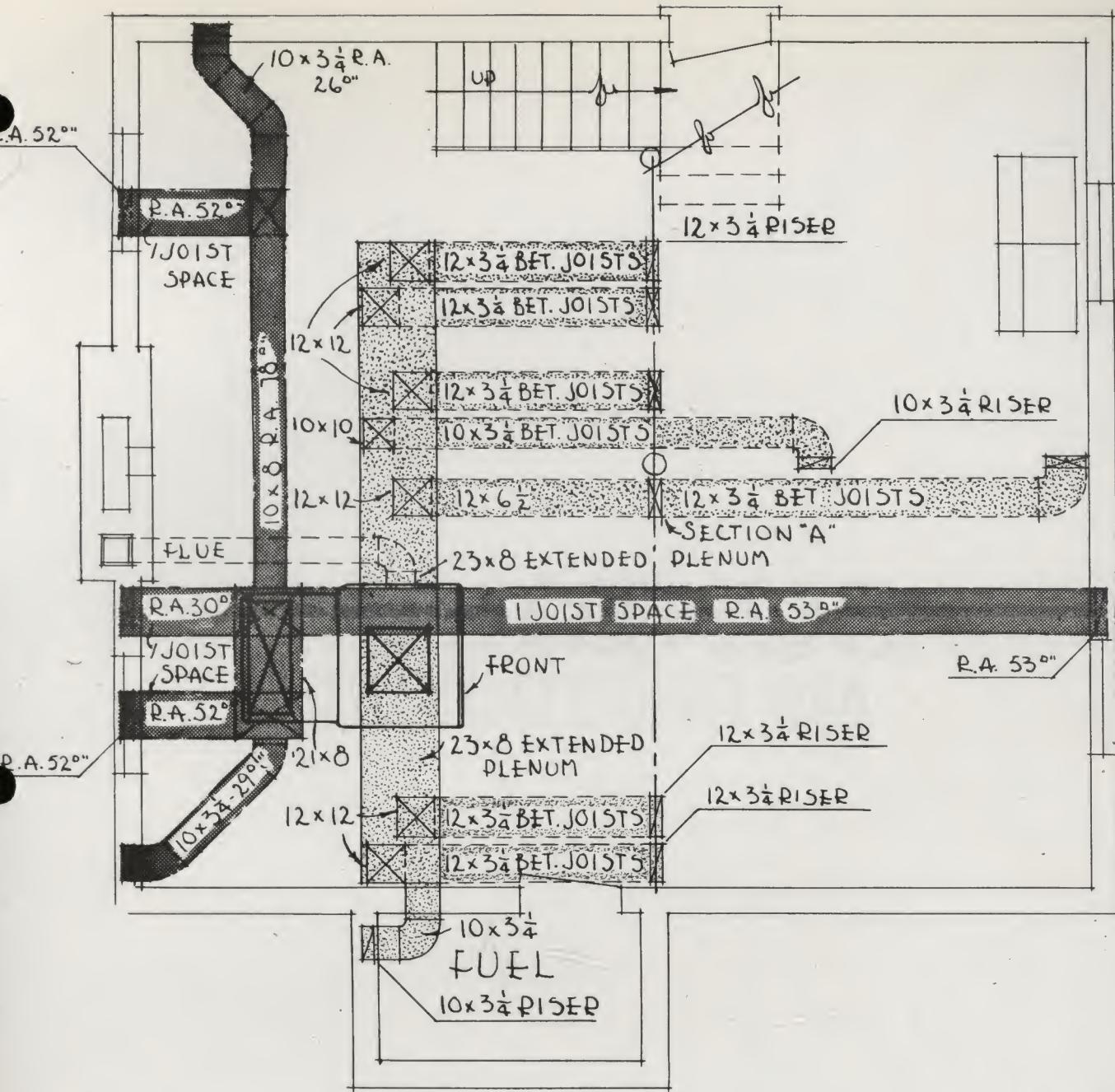
Conventional Trunk Line System

BASEMENT PLAN

7'-6" to Bottom of Joists

Joists rest on Beam



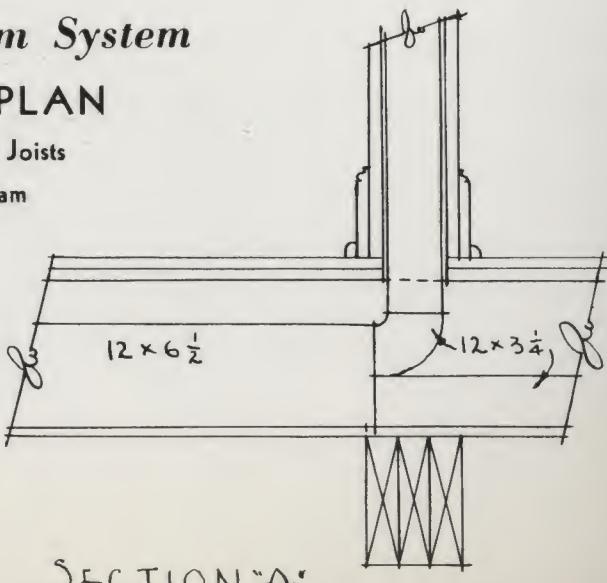
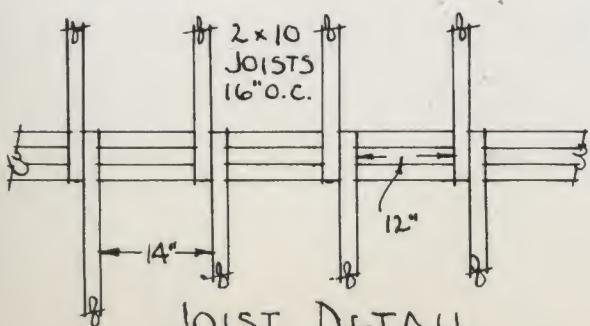


Extended Plenum System

BASEMENT PLAN

7'-6" to Bottom of Joists

Joists rest on Beam

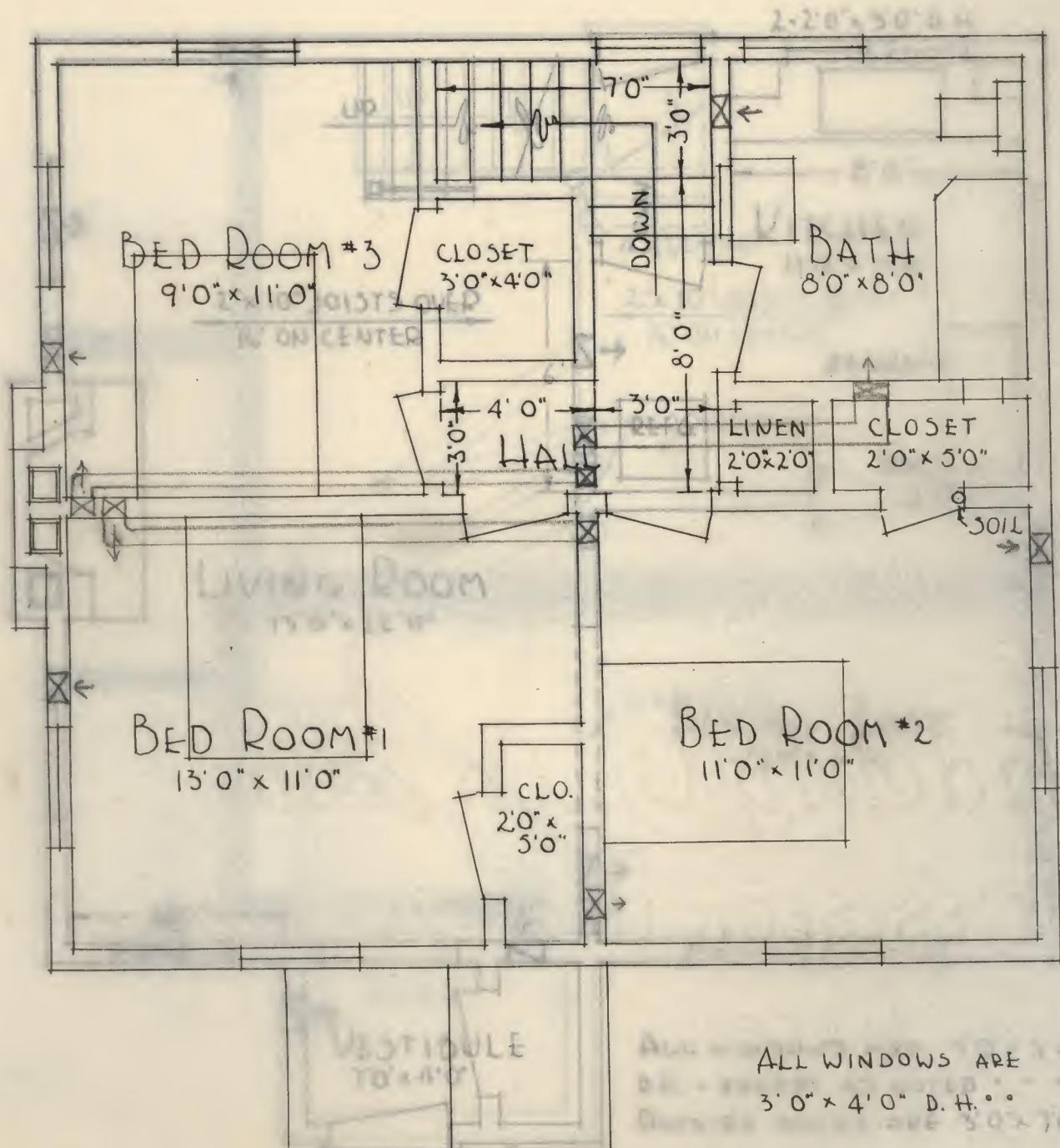


SUNBEAM
AIR CONDITIONING

HOUSE PLAN NO. 2

SUNBEAM AIR CONDITIONING

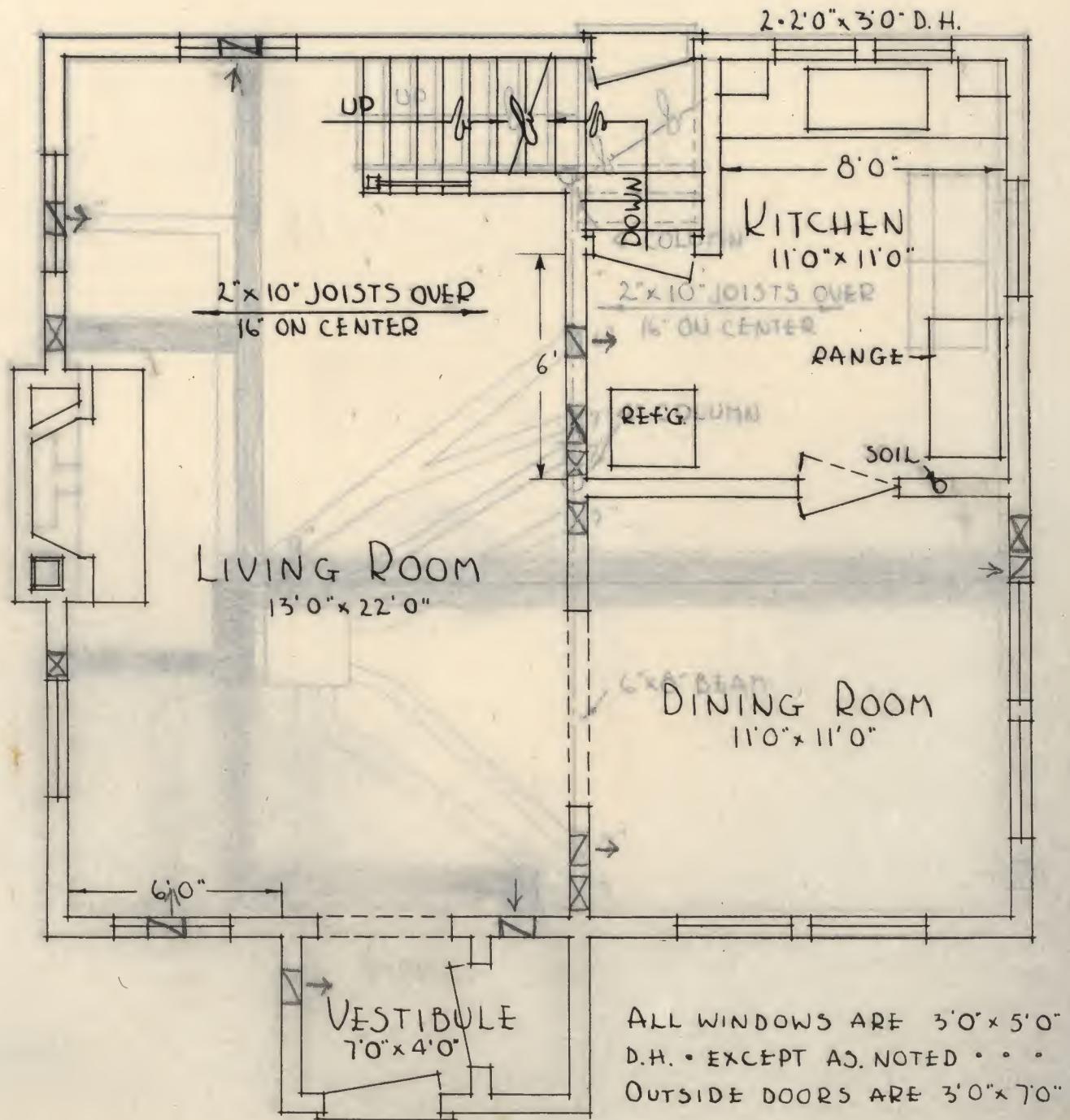
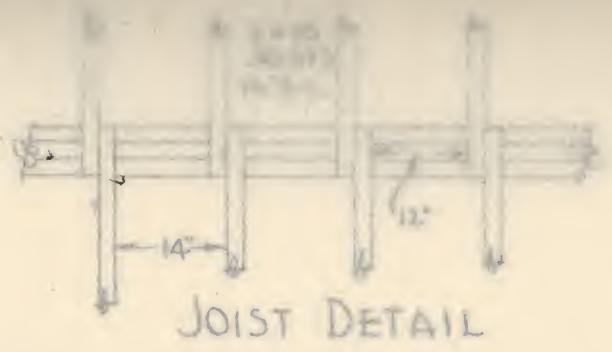
THE FOX FURNACE COMPANY • ELYRIA, OHIO



SECOND FLOOR PLAN

Height of Ceiling 8'-0"

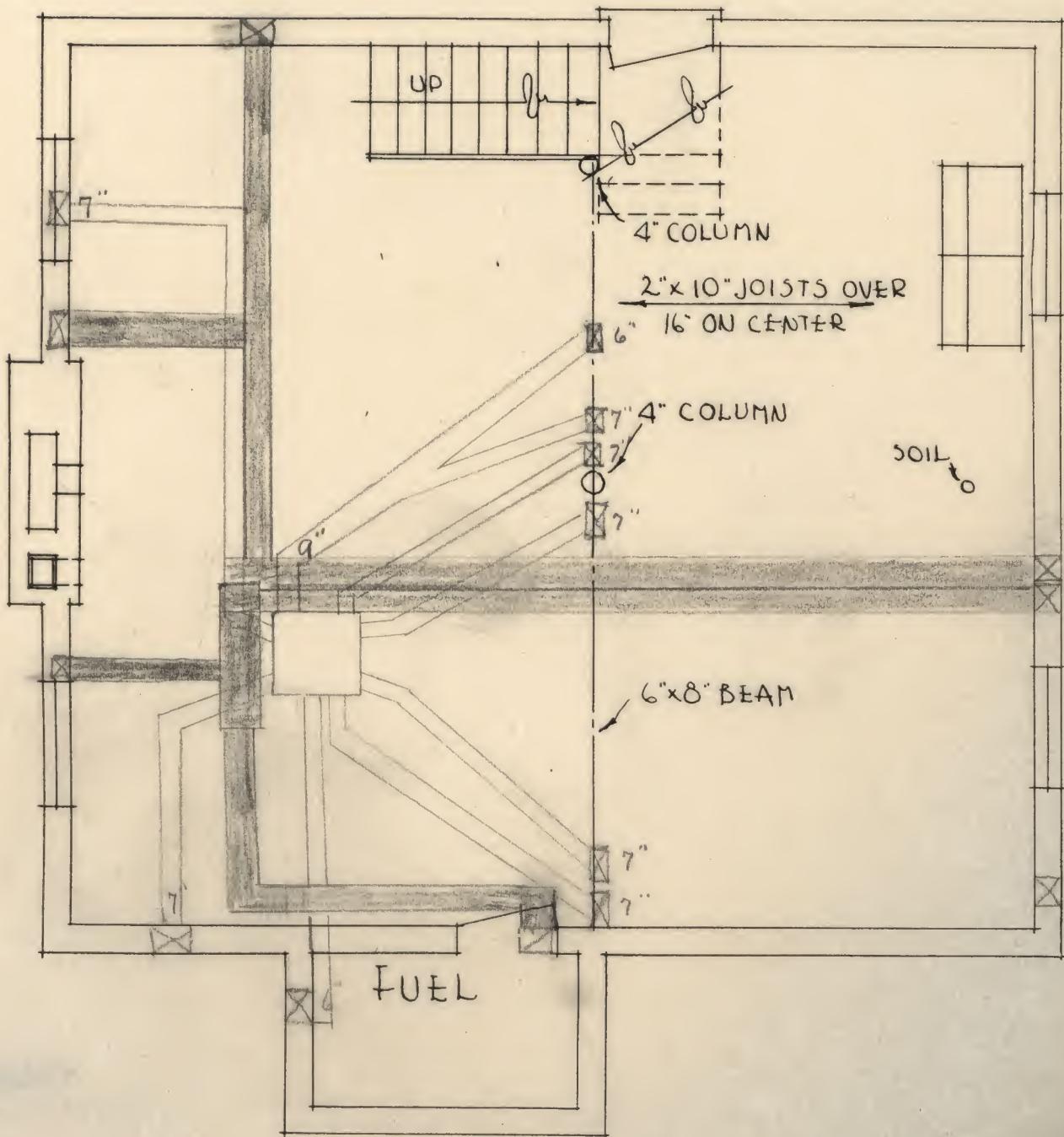
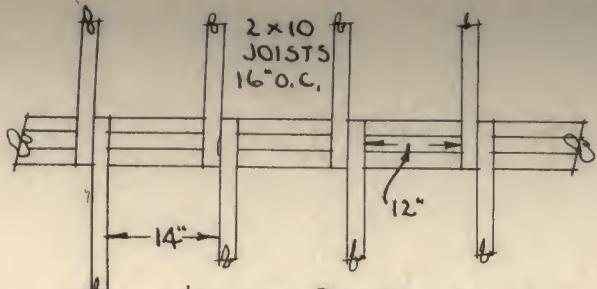
Scale $\frac{1}{4}$ " to the foot



FIRST FLOOR PLAN

Height of Ceiling 8'-0"

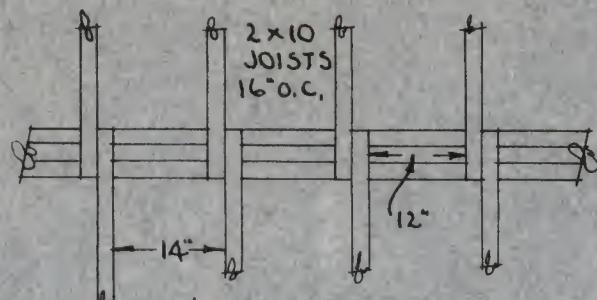
Scale 1/4" to the foot



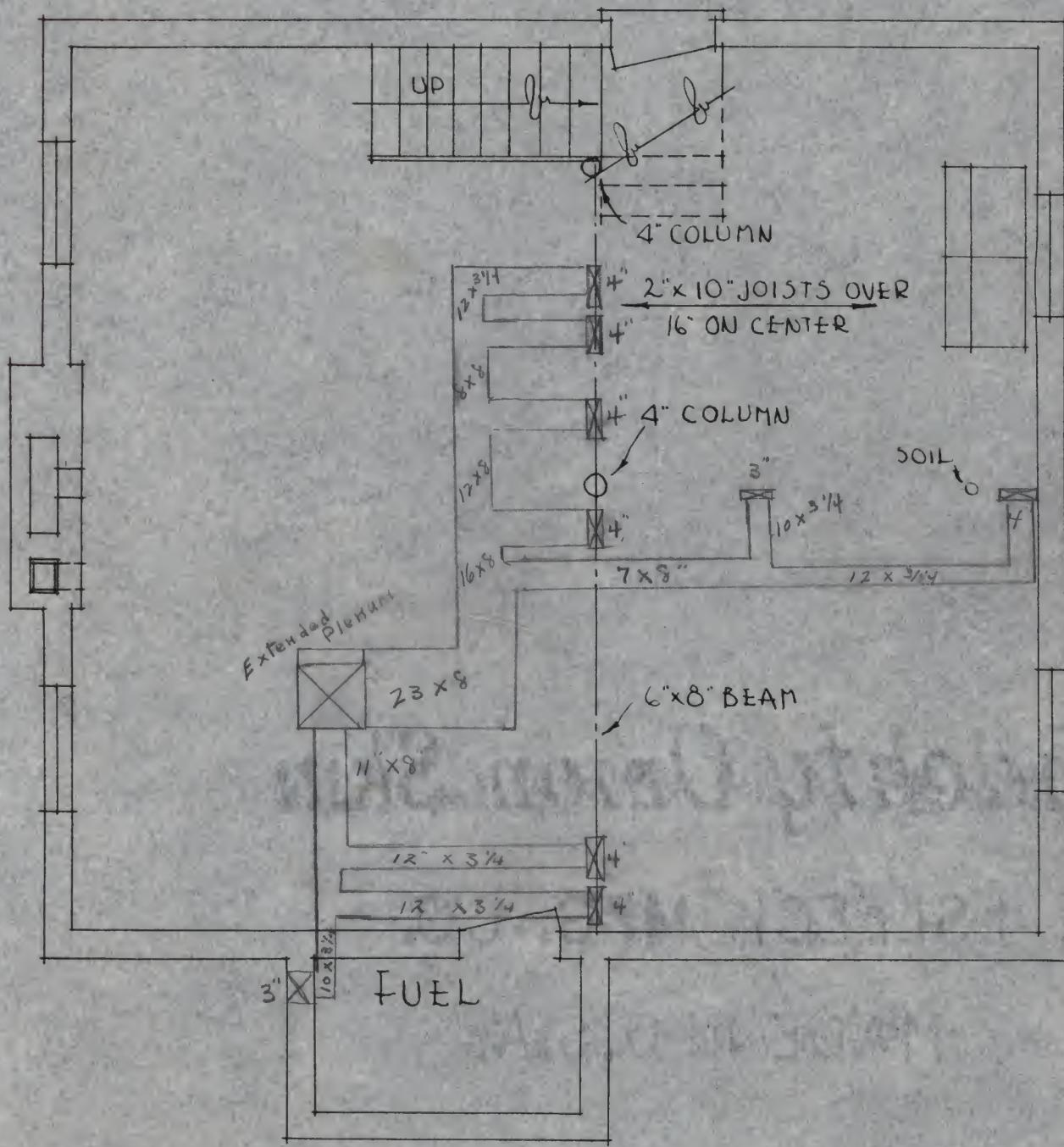
BASEMENT PLAN

Height of Basement 7'-6"

Scale $\frac{1}{4}$ " to the foot



JOIST DETAIL



BASEMENT PLAN

Height of Basement 7'-6"

Scale $\frac{1}{4}$ " to the foot

TENTATIVE PROGRAM

of the

SUNBEAM AIR CONDITIONING

ENGINEERING SCHOOL

* * *

HOTEL KENMORE

BOSTON, MASS.

MARCH 29, 30, 31

Inclusive

* * *

Conducted by

THE FOX FURNACE COMPANY, ELYRIA, OHIO

Division of American Radiator

&

Standard Sanitary Corporation

FIRST DAY

1. Figuring of Data Sheet for House Plan No. 1.
2. Explanation of Trunk Line Layout made by Fox Furnace Engineers for House Plan No. 1.
3. Discussion and Demonstration of Registers.
4. Sales Features and Advantages of Sunbeam Products.

* * *

An evening session will be held if Program is behind Schedule.

SECOND DAY

1. Discussion of Blowers.
2. Discussion of Motors.
3. Designing Individual Pipe Layout for House Plan No. 2.
(Figured Data Sheet is furnished to student).
4. Students design Trunk Layout for House Plan No. 2.
5. Demonstration of Ducts and Fittings.
6. Sales Features and Advantages of Sunbeam Products.

* * *

An Evening Session will be devoted to the engineering of Gravity Warm Air Heating Systems.

THIRD DAY

1. Demonstration of Ducts and Fittings.
Preparing list of material and prices
for Installation of Layout for House
Plan No. 2.
2. Discussion of Oil Burners.
3. Discussion of Controls.
4. Open Forum and Question Period.
5. Talk on Advertising, Sales Promotion
and Market Possibilities.
6. The Sunbeam Selling Program for 1938.
7. Banquet.

* * * *

Fourth Day for Those Who Wish to Remain

The entire day following the above three day Winter Air Conditioning program, will be devoted exclusively to Summer Air Conditioning and figuring of a Cooling Installation with the new Sunbeam Manual. All who are interested in this subject are invited to remain for the extra day. A Cooling system will be designed for House Plan No. 2.

THE BETTER
FINANCE PLAN
FOR
BETTER HOUSING

Enacted February 3rd, 1938



HEATING AND PLUMBING FINANCE CORPORATION

DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

37 WEST 39TH STREET
NEW YORK

YOUR MARKET
AND YOUR OPPORTUNITY
FOR PROFIT

THE PLAN OF THE HEATING AND PLUMBING FINANCE CORPORATION APPLIES ONLY TO INSTALLATIONS OF PRODUCTS OF SUBSIDIARIES OF THE AMERICAN RADIATOR & STANDARD SANITARY CORPORATION IN EXISTING STRUCTURES, IE: MODERNIZING, IMPROVEMENTS, REHABILITATION, REPAIRING OR REPLACEMENT SALES. THIS PLAN, THEREFORE, IS REMOVED FROM THE SEVERELY COMPETITIVE FIELD OF NEW BUILDING CONSTRUCTION.

The largest market for development of heating, air conditioning and plumbing sales lies in old homes and other buildings. Are you aggressively soliciting and developing this business?

The modernization and replacement market is unlimited . . . 15,000,000 old homes and other buildings without any facilities or still equipped with old-fashioned, inadequate, embarrassing and unsanitary heating and plumbing. Such structures are all around you and represent a fertile field for the sale of heating, plumbing and air conditioning products.

Try the Better Plan of the Heating and Plumbing Finance Corporation on one job. You will be so convinced of the splendid business-building possibilities of this simple Plan that gives credit to the customer—cash to you, that you will lose no time in going after the many prospects that are within your convenient reach.

This Better Plan is effective to June 30, 1939 inclusive, or such earlier date which the President of the United States may fix by proclamation.

HEATING AND **P**LUMBING **F**INANCE **C**ORPORATION
ELPS PEOPLE FINANCE COMFORT

Copyright, 1938, Heating and Plumbing Finance Corporation

Heating and Plumbing Finance Corporation

THE Heating and Plumbing Finance Corporation has invested millions in past years in co-operating with the dealers of the United States in financing home owners desiring to rehabilitate their buildings with up to date equipment. The keynote of the Plan is simplicity; it is briefly described herein and is offered in conjunction with the activities of the Federal Housing Administration to the heating, air conditioning and plumbing contractors of America as a sure method of increasing their business. This is not mere guess-work because the Plan has been time-tested and has proved its value. We are thoroughly in accord with the purposes and endeavors of the Government, and are certain that all dealers co-operating with our joint efforts will receive substantial profits.

The Heating and Plumbing Finance Corporation is the pioneer manufacturer-owned finance company, the oldest in the building industry. It is wholly owned and controlled by the American Radiator & Standard Sanitary Corporation which is the leading manufacturer in the heating, air conditioning and plumbing industry. It has an intimate knowledge of the selling problems and requirements of the heating, air conditioning and plumbing contractors and is thus best qualified to serve them in every respect.

The Heating and Plumbing Finance Corporation was organized with the principal object of making it possible for contractors to sell on time payments the heating, air conditioning and plumbing equipment manufactured by our affiliated companies. This Government co-operating Plan was developed with regard for your especial needs as a heating, air conditioning or plumbing contractor and to make possible your whole-hearted contribution together with that of the American Radiator & Standard Sanitary Corporation in the effort to bring Better Times to the building industry through the Better Housing movement and thereby Better Times for our country at large.

Features of the Heating and Plumbing Finance Corporation "Better Finance Plan"

YOU GET THE CASH—
YOUR CUSTOMER GETS THE CREDIT

1. **Without Recourse**—Your endorsement on notes is without recourse; the credit risk on same is ours.
2. **No Holdback**—100% cash advanced to you the minute the job is completed and note purchased.
3. **No Down Payment**—None required, so that you can interest more prospects. Of course, if the purchaser wants to make one, it should be accepted.
4. **Flexible Terms**—You can offer your customer from one year to three years to pay. The time is at their convenience, subject only to a minimum \$10. monthly instalment. The longer terms eliminate sales resistance created by large monthly payments.
5. **Lowest Fees**—Lowest in the history of time payments in conformity with Government requirements, making possible lower quotations.
6. **Credit**—The requirements have been reduced to a minimum, making it easier for your prospects to qualify for credit, thereby increasing your opportunities almost without limit.
7. **Free Credit Investigation**—No charge is made against you for credit investigation.
8. **One Simple Form**—Specially devised by us to afford the greatest possible simplicity and furnished free. Red tape and complicated forms create sales resistance.
9. **Prompt service**—Service that satisfies.
10. **No Legal Expense**—Our Legal Department handles all details at our own expense.
11. **No Collection Expense**—We make all collections at our own expense.
12. **Contractors' Qualifications**—It is unnecessary for a contractor to submit a financial statement. The contractor, however, must be qualified by training and experience to install good jobs; he must have a reputation for fair dealing and good workmanship. This requirement protects the legitimate contractor from unfair competition.
13. **Advertising and Sales Promotion**—American Radiator and Standard Sanitary Corporation spends millions of dollars advertising that its products are available for modernizing on the Better Finance Plan of the Heating and Plumbing Finance Corporation. Sales promotional activities are continually in progress. By associating yourself with us you reap the full benefit of these selling aids.

How the Plan Works

The working of the "Better Finance Plan" of the Heating and Plumbing Finance Corporation is exceptionally simple and free from red tape.

First, after figuring the cost of the job, calculate the financing as explained by the Example in the Rate Chart which appears on back of Property Owner's Credit Statement and illustrated below.

RATE CHART

EXPLANATION

No down payment is required but a down payment can be made if purchaser desires to make one. The number of monthly payments should be determined by the purchaser's ability to pay and should not be for a greater number of months than is necessary. Amounts over \$2,500.00 cannot be financed on this Federal Housing Administration Form. The minimum monthly instalment is \$10.00. Finance fees apply on the amount financed which is the cost of the job less the down payment, if any. To find monthly instalment, divide amount of Note by number of months.

FINANCE FEES ON FEDERAL HOUSING ADMINISTRATION TRANSACTIONS

Amount Financed	12 Mos.	15 Mos.	18 Mos.	24 Mos.	27 Mos.	30 Mos.	33 Mos.	36 Mos.
\$ 1	\$.05	\$.06	\$.07	\$.10	\$.11	\$.12	\$.13	\$.14
2	.10	.12	.15	.20	.22	.25	.27	.29
3	.15	.19	.23	.30	.34	.37	.41	.44
4	.21	.25	.30	.40	.45	.50	.55	.59
5	.26	.32	.38	.50	.56	.62	.68	.74
6	.31	.38	.46	.60	.68	.75	.82	.89
7	.36	.45	.53	.70	.79	.87	.96	1.04
8	.42	.51	.61	.80	.90	1.00	1.10	1.19
9	.47	.58	.69	.91	1.02	1.12	1.23	1.34
10	.52	.64	.76	1.01	1.13	1.25	1.37	1.49
20	1.05	1.29	1.53	2.02	2.26	2.51	2.75	2.99
30	1.57	1.94	2.30	3.03	3.40	3.76	4.12	4.49
40	2.10	2.59	3.07	4.04	4.53	5.02	5.50	5.99
50	2.63	3.23	3.84	5.06	5.66	6.27	6.88	7.48
60	3.15	3.88	4.61	6.07	6.80	7.53	8.25	8.98
70	3.68	4.53	5.38	7.08	7.93	8.78	9.63	10.48
80	4.21	5.18	6.15	8.09	9.06	10.04	11.01	11.98
90	4.73	5.83	6.92	9.10	10.20	11.29	12.38	13.48
100	5.26	6.47	7.69	10.12	11.33	12.55	13.76	14.97
200	10.52	12.95	15.38	20.24	22.67	25.10	27.53	29.95
300	15.78	19.43	23.07	30.36	34.00	37.65	41.29	44.93
400	21.05	25.91	30.76	40.48	45.34	50.20	55.06	59.91
500	26.31	32.38	38.46	50.60	56.68	62.75	68.82	74.89
600	31.57	38.86	46.15	60.72	68.01	75.30	82.59	89.87
700	36.84	45.34	53.84	70.85	79.35	87.85	96.35	104.85
800	42.10	51.82	61.53	80.97	90.68	100.40	110.12	119.83
900	47.36	58.30	69.23	91.09	102.02	112.95	123.88	134.81
1000	52.63	64.77	76.92	101.21	113.36	125.50	137.65	149.79
2000	105.26	129.55	153.84	202.43	226.72	251.01	275.30	299.59
2500	131.57	161.93	192.30	253.03	283.40	313.76	344.12	374.48

Example: \$1,249 is to be financed under Federal Housing Administration Plan for 24 months.

The fee for \$1,000. is \$101.21 for 24 months

" " " 200. " 20.24 " " "

" " " 40. " 4.04 " " "

" " " 9. " .91 " " "

The fee for \$1,249. is \$126.40 for 24 months

By adding the fee of \$126.40 to the amount of \$1,249. financed you get \$1,375.40 the amount of the Note. The total finance fee for any amount to be financed is simply arrived at by adding together the fees in the column for the number of months the Note is to run appearing opposite the amounts which added together equal the amount to be financed. In figuring finance fees, disregard odd cents of the amount to be financed.

Next fill in the Statement of Transaction on back of Property Owner's Credit Statement. (See Exhibit "A" on page 4).

Dealer:

1. Use this form where the amount to be financed does not exceed \$2,500.00.
2. There must be no alterations on the Property Owners' Credit Statement in the number of months or the amount applied for, total income, the name of the title holder or signatures.
3. Have property owners fill in all spaces on Property Owner's Credit Statement and also sign their names thereto in your presence exactly as they appear in the title.
4. Detach and hold Note and Completion Certificate.
5. Do not start work until credit approval is received.
6. Use only new products of American Radiator and Standard Sanitary Corporation subsidiary companies. Only new materials and installations in existing structures can be financed.
7. When work is fully completed in accordance with terms of contract, have Note and Completion Certificate executed and then send in for purchase, not before.
8. Use ink or typewriter to prepare Note, Property Owners Credit Statement and Completion Certificate. Have signatures made in ink.
9. Notes with erasures or changes will not be purchased. Prepare a new Note.
10. Dealer's contract should contain a clause that deferred balance is to be covered by a Note and that acceptance of contract is subject to sale of such Note to a finance company of dealer's selection.
11. Notes purchased under the terms of the U. S. Government's Federal Housing Administration Plan are subject to their review. Therefore every care should be taken to satisfy the purchasers and complete the work; also to make sure the Note is executed under proper circumstances and by the purchasers personally in the dealer's presence.

DEALER: Fill in this **STATEMENT OF TRANSACTION** completely.

Cash Selling Price..... \$ 1,249.00.....

Cash Down Payment—(Dealer Retains)..... Subtract \$

Balance to be Financed..... \$ 1,249.00.....

H&PFC Fee..... (24) Add \$ 126.40
(INSERT NO. MONTHS)

Deferred Balance—(Amount of Note)..... \$ 1,375.40.....

To find monthly instalment, divide amount of Note by number of months.

Product or material to be installed and maker's name:

1-S-711 - Ideal Boiler -225 feet Corto Radiation

11 Airid Valves, 11 Detroit Valves

1 #11 Excelso

1-P-2317 - 5 ft. Pembroke Bath with #B73 Shower
complete with curtain rod

1-F2045 Compact Closet - with Church Seat

1-P-3127 Clyde 24x20 Lavatory

1-Kewanee Garbage Burner

1-#10 Ventura Fan

From whom Doeville Supply Co.
Purchased (Name of American Radiator & Standard Sanitary Corp. Subsidiary Company
 or name of wholesaler)

Exhibit "A"

When you have signed up a prospect on your own regular contract, you have the prospect fill out the Property Owner's Credit Statement (top portion of form covered by Exhibit "B" on page 5). This should be signed by the property owner exactly as his deed reads; and by both husband and wife in case of married parties. Each question must be answered carefully, accurately, and truthfully.

Second, detach and mail immediately the filled-in Property Owner's Credit Statement (top portion of form covered by Exhibit "B") to your branch of the American Radiator & Standard Sanitary Corporation subsidiary or to your wholesaler according to your sale. We make a quiet, courteous investigation of the purchaser's credit and notify you promptly whether approved or rejected. Do no work on contract until you receive our Credit Approval Notice.

to Hamilton Heating & Plumbing Co., 450 Walnut St., Doeville, New York Date February 11 1938
 (Dealer's or Contractor's Name) (No.) (Street) (City) (State)

The following information is given for the purpose of inducing you to grant credit under the provisions of Title I of the National Housing Act. The approximate amount of credit required by me (us) for 24 months is \$1,375.40

Married Age 45 Number of Dependents 2 How long at present address 8 yrs.

Employed by Self Name and Address of Business or Employer Smith Brothers, 5 Main St., Doeville, N. Y. Telephone Business Maine 6-2020
 Employed by Others Name and Address of Business or Employer John Doe Telephone Home Texas 3-1958
 How long 10 yrs. Position Superintendent Name of Superior Vice-President
 Yearly Salary or Wages 2,627.00 Commission none
 Net Business Income 2,627.00 Rentals and Other Total Yearly Income \$4,837.00
 Source of Other Dividends on stocks - interest on bonds Kind of Business Foundry
 Yearly Income
 Name of previous employer Doe Foundry Co., Doeville, N. Y. Total time unemployed last three years None
 If self-employed in farming, what portion of your income is derived directly from sale of agricultural crops, commodities and live stock none State at what periods of the year such income is customarily received
 Name of bank at which Personal checking account is kept Doeville Trust Co. Account is in name of Peter Fraser
 Savings or trust account is kept Doeville Savings Bank Account in name of Peter & Clara Fraser
 Amount of Capital and Income \$5,000.00 Name of Peter Fraser Names of Beneficiaries Clara Fraser
 Cash Surrender 1,057.00 Name of Insurance Co.
 Name and address of all bank, loan installment companies, or others to whom I (we) owe money have charge accounts with, or am (are) making installment payments (not including F.H.A. loans).
 Parisian Jewelry Co., 10 Pike St., Doeville, N. Y. 998 3/27/37 150.00 10.00 50.00
 Pine Furniture Co., 11 Pine St., Doeville, N. Y. 16942 11/20/35 755.00 20.00 215.00
 Perfect Radio Co., 30 Elm St., Doeville, N. Y. 176 11/7/37 80.00 10.00 40.00
 Address of Property to be improved 210 Laurel St., Doeville, N. Y. Year Purchased 1929 Purchase Price of Property \$8,250.00
 Description and use of above property Multiple family residence
 I (we) certify that the improvements of this loan will be expended as itemized below Estimated Contractors or Dealers Name and Address
 Description of improvements (Specify accurately or installation planned or contemplated) Cost
 New heating system & new bath room \$1,375.40 Hamilton Heating & Plumbing Co.
 Incinerator & ventilating fan \$ 450 Walnut St., Doeville, N. Y.
 Title is recorded Peter & Clara Fraser
 Description of mortgages, other liens or contracts against property to be improved Held by Contractors Name and Address
 1st Mortgage Doeville B. & L. Assoc. 4/1/41 Annual Payments Matrity Date Principal & Interest Amount, if any, in default Balance Due
 15 Grand St., Doeville, N. Y. \$ 8,000.00
 Estimated Value of home \$5,000.00
 Total of mortgages or other liens against such other owned real estate none Are any mortgages, liens or leases in default? NO What arrangements made on any defaults?
 Do you have any Home Owners' Loan Corporation Mortgages? NO Are any in default? NO If so, for? What is monthly payment? for principal and interest?
 Are you obligated to any other Agency or Department of the Federal Government? YES Explain F.H.A. Title I loan for improvements on 27 Broadway (see below)
 Are any payments on such obligations in arrears? NO Are all owned structures covered by insurance? YES
 If property to be improved is rented, from whom and address State whether or not all taxes, assessments, fire and renter's insurance are up-to-date (Yes or No) yes Were you ever in bankruptcy? no If so, give details Date lease expires
 Have any judgments, garnishments, suits or legal proceedings against you? (Yes or No) yes If so, give particulars Auto accident suit by P. Doe, (insurance covers)
 List below any F.H.A. loans made under Title I or Title II National Housing Act. If none, state "None."
 Note Now Held By Address of Property Improved Date of Note Original Amount Unpaid Balance
 Doeville Trust Co. 27 Broadway, Doeville, N. Y. 1/1/37 459.81 293.77
 Are any payments due? NO
 Have you made application for this credit? NO From whom? Was application Accepted Rejected
 Are you applying for any other F.H.A. improvement loans at this time? NO If so, from whom? For what amount?
 Name and address of four business Acme Coal Co., 55 Water St., Doeville Durable Painting Co., 19 Park Ave., Doeville
 (Name and address) (Name and address)
 I (we) authorize you, or any financial institution to which you may desire to offer my (our) note for sale, to obtain such information as you (they) may require concerning the above statement and agree that the name of your (their) proposed buyer or my (our) note is finally granted by you (they) to whom such information has been concealed which is essential to a proper loan in this case; that no payment shall have been made in this credit statement and that if the loan is granted to me (us) or my (our) note purchased, the ENTIRE PROCEEDS WILL BE USED EXCLUSIVELY IN PAYMENT FOR ALTERATIONS, REPAIRS, OR IMPROVEMENTS UPON OR IN CONNECTION WITH AN EXISTING STRUCTURE. I (we) hereby affirm that the foregoing information is true and correct. Peter Fraser
 Signature of Property Owners or Applicant. Clara Fraser
 Approved by Peter Fraser
 Federal Housing Administration Residing at 210 Laurel Street, Doeville, New York (No.) (Street) (City) (State) Form H.P.F.C. F.H.A.-P (3-38)
 NOTE--This form should be filled out completely, using "No" or "None" where necessary.

1,375.40 Date February 25 1938
 For value received, I promise to pay to the order of Hamilton Heating & Plumbing Company (Dealer's Name)

One Thousand Three Hundred Seventy Five and 40/100 Dollars

In 24 equal consecutive monthly installments, beginning March 28, 1938 after date hereof, at the office of HEATING AND PLUMBING FINANCE CORPORATION, 37 West 39th Street, New York, N. Y., with interest from maturity and 15% of the unpaid amount of this note as attorney fees if placed in the hands of an attorney for collection. Upon nonpayment of any installment when due, all remaining installments shall immediately become due and payable.

Signatures Peter Fraser
 Clara Fraser

Post Office Address 210 Laurel Street (P. O. Box) (R. D. No.) (No.) (Street) (City) (State)

TO HEATING AND PLUMBING FINANCE CORPORATION: Date February 25, 1938
 Hamilton Heating & Plumbing Company (Dealer's Name)

I (We) hereby certify that I (we) have to-day issued to Peter Fraser
 \$1,375.40 which represents the balance due for article(s) and material(s) which the aforesaid dealer has delivered and installed in my (our) premises in a satisfactory manner, and acceptance of such note does not waive my rights, if any. Payments made by me (us) on account of above note to any other party than the holder of the note shall be made at my (our) risk and shall make such note still my (our) agent.

DO NOT SIGN UNTIL INSTALLATION IS COMPLETED
 Signature Peter Fraser
 Clara Fraser

As an inducement to the Heating and Plumbing Finance Corporation to purchase the above note, I (we) certify that the signature(s) on the note was (were) signed in my (our) presence and that I (we) have delivered the article(s) and material(s) called for, and completed the installation thereof in a satisfactory and workmanlike manner, in accordance with best acceptable standards.

Signature of Dealer Hamilton Heating & Plumbing Co. By H. A. Hamilton Title Proprietor

Third, when the installation is completed, have the purchaser (if married, husband and wife) sign the Note and Certificate of Completion (Exhibit "B") in the exact manner called for on the Credit Approval Notice. The date of the first instalment payment to be inserted in the Note can be any date (except Sunday) in the month following the date of the Note providing there is at least a lapse of six days between date of Note and date of first payment. The date of payment should be determined by the purchaser to suit his convenience and dates of his income, thus avoiding defaults and penalties. The Note and Certificate of Completion should be dated the date of completion of the work (except Sunday). Note endorsed by the contractor as shown herewith (Exhibit "C") and Certificate of Completion also signed by contractor (see Exhibit "B"), are then mailed to the branch or wholesaler handling your transaction.

Where husband and wife cannot sign, a cross mark should be used—mark to be witnessed by a disinterested third party (not dealer or member of purchaser's family) with name and address of witness to appear on left-hand side of face of Note.

Prepare all Notes on the typewriter or with ink and have all signatures in ink. Do not use pencil. Make no erasures or changes of any kind on the Note, because we cannot accept such Notes. Whenever a correction is necessary, prepare a new Note.

Immediately upon receipt of the Note and Certificate of Completion, after completion of all work, the Heating and Plumbing Finance Corporation will issue check for the full amount financed. You get all your money. As far as you are concerned it is a cash job.

For value received, we the undersigned endorsers on this note, severally waive presentation and demand for payment, protest and notice of protest for non-payment, and accept all provisions of said note; we agree that our liability on this note shall not be affected by any indulgence, extension or extensions, in whole or in part, compromise or settlement by or with the makers of this note or any other person interested, and we further agree that in case of non-payment of the within obligation when due, suit may be brought by the holder of this note against any one or all of us at the option of said holder whether suit has been brought against the maker or not, and that in any suit the maker may be joined with one, or more, or all of us at the option of the holder.

ENDORSERS:

.....
(Name)

.....
(Address)

.....
(Name)

.....
(Address)

.....
(Name)

.....
(Address)

.....
(Name)

.....
(Address)

WITHOUT RE COURSE

Hamilton Heating & Plbg. Co.

BY *W.A. Hamilton*
(Name)
Prop.
430 Walnut St., Doeville,
(Address) New York
(Name)

.....
(Address)

.....
(Name)

.....
(Address)

BE SURE TO FOLLOW THESE DIRECTIONS:

1. Experience has proven that it helps to close sales to first quote a time-payment price and for the longest period (three years), as the small monthly payment has a great attraction for most buyers. If the buyer is economy-minded and wishes to save on fees, the number of months can be reduced to suit his circumstances. Quoting time-payment prices first also enables you to offer attractive discounts for cash, an inducement which causes many prospects who can pay cash to sign a contract immediately, in order to realize the apparent saving it affords.
2. Have property owners fill in all spaces on Property Owner's Credit Statement and also sign their names thereto exactly as they appear in the title.
3. Detach and mail Property Owner's Credit Statement to your branch of American Radiator & Standard Sanitary Corporation subsidiary or to your wholesaler.
4. Hold Note and Certificate of Completion forms.
5. Do not start work until credit approval is received.
6. Use only new products of American Radiator & Standard Sanitary Corporation subsidiary companies. Second-hand materials or installations in new buildings cannot be financed. Buildings destroyed by fire and reconstructed are considered new buildings and are not eligible for financing. Also, on transactions where mortgage is held by Home Owner's Loan Corporation, no installation can be financed where structural changes are made without consent of Home Owner's Loan Corporation.
7. When work is fully completed in accordance with terms of contract, have Note and Certificate of Completion executed by purchaser, then endorse Note without recourse and sign Certificate of Completion and send in for purchase, not before.
8. Use ink or typewriter to prepare Notes. Have signatures made in ink.
9. Notes with erasures or changes will not be purchased. Prepare a new Note.
10. Every care should be taken to satisfy the purchasers and complete the work; also to make sure the Note is executed by them personally and under proper circumstances.
11. Form H.P.F.C.—F.H.A.-P, (as per Exhibit "B"), is to be used in all states except Pennsylvania, Maryland, Ohio, Wisconsin, Illinois, Colorado and Delaware, where Form H.P.F.C.—F.H.A.-J is required.

SUMMARY OF ADVANTAGES TO YOU

I. ELIMINATES YOUR LOSSES

When you receive our check for the Note, you are paid in full for your labor and materials, and also your profit. It is impossible to lose. How different from your book accounts when often you lose all or part of the bill.

II. STEADY WORK THE WHOLE YEAR AROUND

Under the old cash policy a home owner naturally waited until the last minute to make his purchase. Result . . . one grand rush all at the same time—more work than was humanly possible to accomplish—slack periods with tied-up capital and idle workmen during a large part of the year.

With our Better Finance Plan, go to the home owner any time. He does not have to go to a bank—you can handle the whole simple transaction right in his own home or office, all red tape eliminated. He has up to three years to pay, with easy monthly instalments. You get from us your full CASH SELLING PRICE on completion of work.

It gives you steady work the whole year round, your employees regular employment.

III. MORE BUSINESS ON LESS CAPITAL

You do not require as much working capital in proportion to your total sales as you would to finance your customers yourself.

IV. MORE SATISFIED CUSTOMERS

Your work being more equally spread over the year, your jobs are not rushed. You can offer better craftsmanship and be assured of better satisfied customers, which will give you favorable advertising and result in more sales with no additional selling expense.

V. LOWER COST OF DOING BUSINESS

Your overhead will be lowered all along the line.

VI. NO FROZEN ASSETS—MORE CASH DISCOUNTS

You will not have to carry any customers' open accounts, for we furnish the cash. You get all cash immediately, which enables you to discount your bills—a considerable profit at the end of the year. Your book-keeping is also reduced.

VII. MEETS COMPETITION FROM OTHER INDUSTRIES

This "Better Finance Plan" affords you the same facilities which have developed the automobile, refrigerator, radio, vacuum cleaner and other similar industries to gigantic proportions.

These are Proven Methods for Developing Time Payment Business by Contractors.

- (a) Hire special canvassers to secure names of prospects by house-to-house calls. These canvassers can use cards printed or typed by the dealer. These cards can also be used to advantage as Inspection Reports.
- (b) House to house salesmen—suitable literature to be left with prospects and when possible have each prospect visit show room.
- (c) Newspaper advertising (copy can be secured from Advertising Dept.)
- (d) Window display and advertising. (Consult Advertising Dept. of Manufacturer.)
- (e) Telephone directory advertising, emphasizing convenient terms.
- (f) Mail letters and booklets to home owners. Mailing lists can be secured from many sources.
- (g) Contractor's letterheads, bill heads, printed and advertising matter, should carry a clause "Monthly Payments Arranged", or something similar.
- (h) Distribute hand-bills in localities where effective.
- (i) Get five or more names of prospects from each of your purchasers through use of postcards. Suggest that suitable compensation be given to old purchasers when sales are made on leads furnished by them.
- (j) Follow up prospects to whom you have already given quotations.
- (k) Make free service calls on old purchasers to sell them additional equipment and to secure names of prospects.
- (l) Canvass telephone subscribers. Use regular or special office force, contacting either by mail or phone.
- (m) Realtors. Consult real estate dealers regarding vacant homes, old homes, stores and apartment houses.
- (n) Work with Building & Loan Assos., banks, mortgage institutions, etc.
- (o) Contact architects so as to learn of proposed remodelling work.
- (p) Watch "rooms to let" advertisements in local papers. Follow up those needing modern plumbing and heating equipment.
- (q) Secure names of prospects from gas, water and electric meter readers.
- (r) Secure names of prospects from local coal dealers.
- (s) Secure names of prospects (from building permit clerks) for remodelling.
- (t) Make acquaintance of local tax assessor for purpose of obtaining list of property owners in your vicinity.
- (u) Keep in touch with Board of Health inspector for violation of sanitary code with idea of remodelling or installing new plumbing equipment.
- (v) Use motion picture slides.
- (w) Use facilities of local radio broadcasting station for your own or group sponsoring of radio programs.

HEATING AND PLUMBING FINANCE CORPORATION
(UNDER SUPERVISION OF NEW YORK STATE BANKING DEPARTMENT)

**37 WEST 39TH STREET
NEW YORK**

FINANCING ON CONVENIENT MONTHLY PAYMENTS
THE PRODUCTS OF THE FOLLOWING COMPANIES
THROUGH ANY OF THEIR OFFICES
OR WHOLESALERS:

AMERICAN RADIATOR COMPANY
40 West 40th St., New York, N. Y.

STANDARD SANITARY MFG. CO.
Bessemer Bldg., Pittsburgh, Pa.

FOX FURNACE COMPANY
Elyria, Ohio

KEWANEE BOILER CORPORATION
Kewanee, Illinois

AMERICAN BLOWER CORPORATION
6000 Russell St., Detroit, Mich.

AMERICAN GAS PRODUCTS CORPORATION
40 West 40th St., New York, N. Y.

STANDARD AIR CONDITIONING, INC.
50 West 40th St., New York, N. Y.

THE ACCESSORIES COMPANY, INC.
50 West 40th St., New York, N. Y.

ROSS HEATER & MANUFACTURING COMPANY, INC.
Buffalo, New York

C. F. CHURCH MANUFACTURING COMPANY
Holyoke, Mass.

EXCELSO PRODUCTS CORPORATION
65 Clyde Avenue, Buffalo, New York

CAMPBELL METAL WINDOW CORPORATION
30 Rockefeller Plaza, New York, N. Y.

SUNBEAM

AIR CONDITIONING



THE FOX FURNACE COMPANY • ELYRIA, OHIO
A DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

THE SERIES NO. 20

SUNBEAM

AIR CONDITIONING UNIT

Side view of Series No. 20 Sunbeam Air Conditioning Unit showing position of blower, motor and filters.



Front view of Sunbeam Series No. 20 showing rounded corners, pleasing proportions and green crystalline enamel finish of the new and modern cabinet.

This Series No. 20 meets the demand of the average home owner who desires the benefits of air conditioning and is seeking a moderately priced unit to install in a new home or to replace an inefficient furnace.

The features of this unit are such as you would expect to find in a product manufactured by the world's largest makers of heating equipment. The heating element is constructed of heavy, durable cast iron. A galvanized inner casing is provided to increase efficiency and reduce heat loss into the basement.

The modern cabinet — with its rounded corners, bolts and screws eliminated, and green crystalline enamel finish — possesses a rich beauty seldom found in moderately priced units.

Blower, motor, filters, humidifiers and controls used with this Series No. 20 are illustrated and described on pages 9, 10 and 11.

MODERN CABINETS—MECHANICALLY IMPROVED— HANDSOME IN APPEARANCE

The artistic design of the cabinets of the Series Nos. 20, 80 and 5500 presents an attractive appearance that will appeal to every home owner. The pleasing proportions, gracefully rounded corners and fine grained, green, crystalline enamel finish, give a striking appearance that will make these air conditioners easier to sell.

In addition to its beauty, these new cabinets also offer important mechanical advantages. All parts are die cut and formed and are connected by snug fitting slip joints which make these cabinets remarkably air-tight. The illustration opposite shows the tight interlocking slip joints.

Assembly time is reduced because the die formed parts fit together accurately and quickly, and the use of sheet metal screws is eliminated. Cabinets are made of No. 20 gauge steel. The use of this heavy steel and the interlocking slip joints assures rigid, firm cabinets.

HEATING ELEMENT OF THE SERIES NO. 20 SUNBEAM AIR CONDITIONING UNIT

The heating element of the Series No. 20 has been designed to give the home owner three vital advantages; ample capacity, high efficiency and years of trouble-free operation.

A large area of heating surface has been incorporated in its modern design without restricting the free circulation of air. It extracts the greatest amount of heat from the fuel.

This heating element has none of the objectionable, vertical joints through which gas and dust might escape. The deep firepot holds a large bed of fuel thus lengthening the firing periods. Ashes cannot accumulate against its steep sides. Joints are deeply cupped to assure a leak proof union.

The iron used in the construction of this heating element is the famous "Sunbeametal", a special type of furnace iron found exclusively in Sunbeam products. Many years of experience have proved its ruggedness and long life.

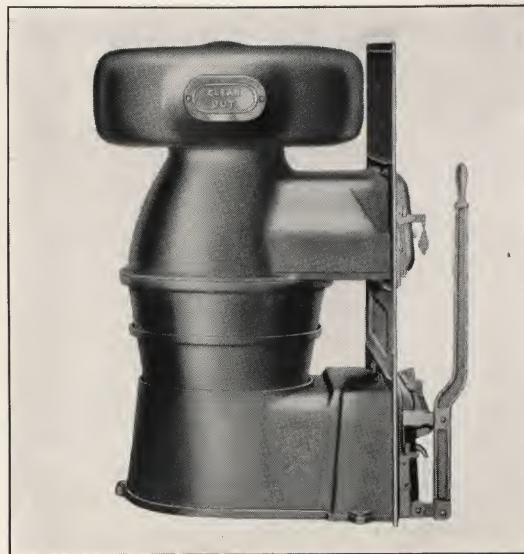
INNER CASING CONSTRUCTION

The inner casing of galvanized iron surrounds the heating element and brings the air into intimate contact with the heat radiating surfaces.

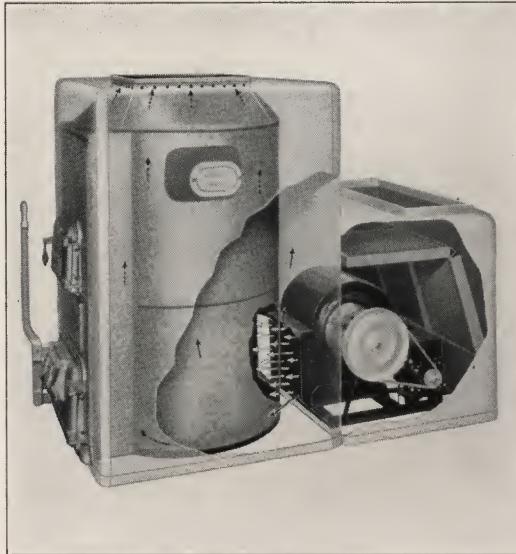
Most of the air which is drawn into the unit is forced by the blower through the opening in the inner casing, where it is warmed by the heating element. However, a space provided between the outlet of the blower and the opening in the inner casing, allows part of the air to circulate between the inner and outer casings to keep the exterior of the cabinet cool. This "insulating" air joins the warm air through the round openings at the top of the inner casing. These openings also allow pressure within the heating compartment to equalize.



The above picture illustrates the interlocking, snug fitting slip-joint connections of the New Sunbeam Cabinet.



The long-lived, cast iron heating element of the Series No. 20



The white arrows in the above illustration indicate the air delivered inside of the inner casing. The black arrows indicate circulation of "insulating" air between inner and exterior casings.

THE SERIES NO. 80
SUNBEAM
AIR CONDITIONING
UNIT
•
OIL OR COAL FIRED

This view of the Series No. 80 Sunbeam shows the position of blower, motor and filters. The oil burning model, with door for rotary type burner, is shown. This illustration shows how all basement air passes through the filters, when access door to blower compartment is removed.



This front view of the Series No. 80 shows the coal burning, hand-fired, model.

The experience of more than half a century in the heating industry, in combination with the resources of the largest manufacturers of heating equipment enables the Sunbeam organization to offer this outstanding air conditioner.

Users throughout the country attest to the long life and high efficiency of the substantially built steel heating element with which this air conditioner is equipped. Like other Sunbeam Units the Series No. 80 has a specially designed inner casing that prevents heat loss.

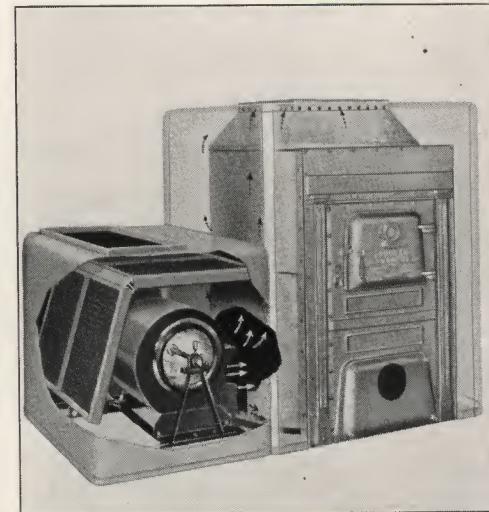
The new green, crystalline enamel cabinet, with which this Series is equipped, gives an unusually attractive appearance. Details of this cabinet are given on page 3.

This Series is made in four models; two for coal — hand fired and stoker fired; two for oil — one for gun type and one for rotary type burners.

See pages 9, 10 and 11 for description of blower, motor, filters, humidifiers and controls used with the Series No. 80.

INNER CASING CONSTRUCTION

The casing construction of the Series No. 80 is similar to that of the Series No. 20. In the side of the galvanized inner casing is a large opening which permits most of the air discharged from the blower to pass into the heating compartment. The remainder of the air circulates between the inner and outer casings and keeps the exterior of the cabinet cool. Openings at the top allow the "insulating" air to join the heated air. Pressure within the heating compartment is equalized through these openings.

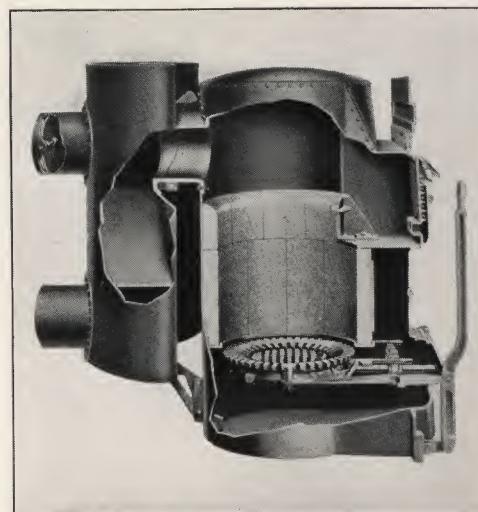


A view of the Series No. 80 showing distribution of air within the heating compartment.

HEATING ELEMENT OF SERIES NO. 80 SUNBEAM AIR CONDITIONING UNIT

The heating element of Series No. 80 Sunbeam is constructed of heavy weight boiler plate, with the joints riveted and welded to produce a seamless unit from which no gas, fumes, smoke, soot, dirt or dust can escape. This leak proof element, in combination with the filters, makes the Sunbeam the cleanest system available. Because of its generous amount of heating surface and long fire travel, this heating element offers large heating capacity, high efficiency and economical fuel consumption with either oil or coal.

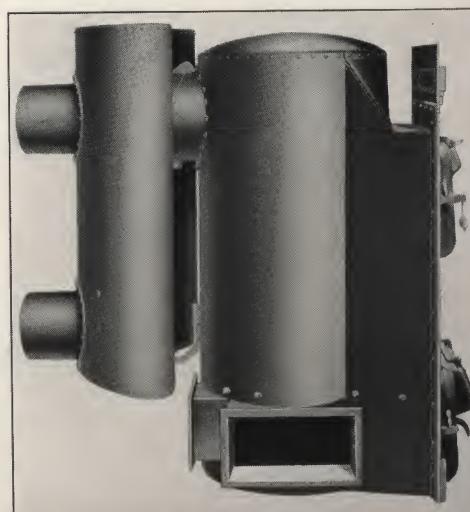
All the steps involved in manufacturing these heating elements are performed in the new steel fabricating plant of The Fox Furnace Company at Elyria, Ohio. This plant is the most advanced of its kind, anywhere. Only the most up-to-date equipment, that the market afforded or that was specially designed by Sunbeam engineers, is found in this new factory.



Interior view of coal burning hand fired heating element.

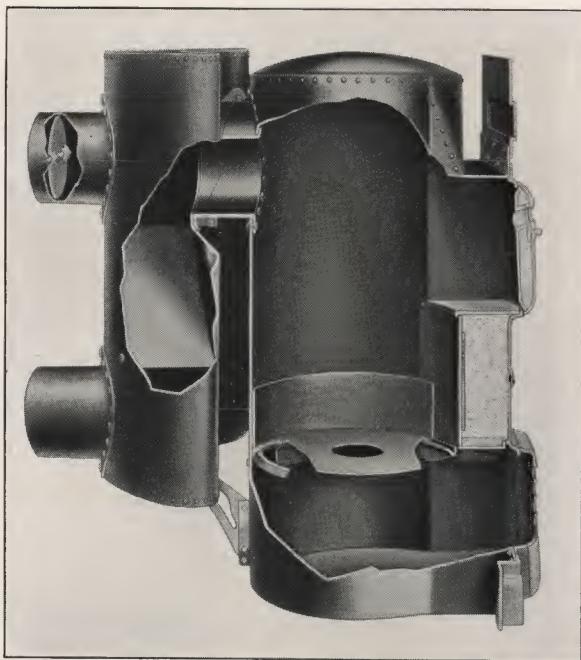
STOKER FIRED MODEL

A special Stoker Fired Model of the Series 80, which will accommodate any standard make of hopper or bin feed stoker, is available. The heating element of this model is equipped with steel chutes on both sides, and at rear, so that stoker can be installed from front, (through ash pit door) rear or either side without any cutting on the part of the installer. Metal covers and gaskets are provided to seal the chutes not used. Bin feed stoker, with screw tube *below* base of Unit must be installed in the coal hand-fired model. Fire brick lining around fire box section and regular coal burning doors are standard equipment. Grate assembly is omitted.

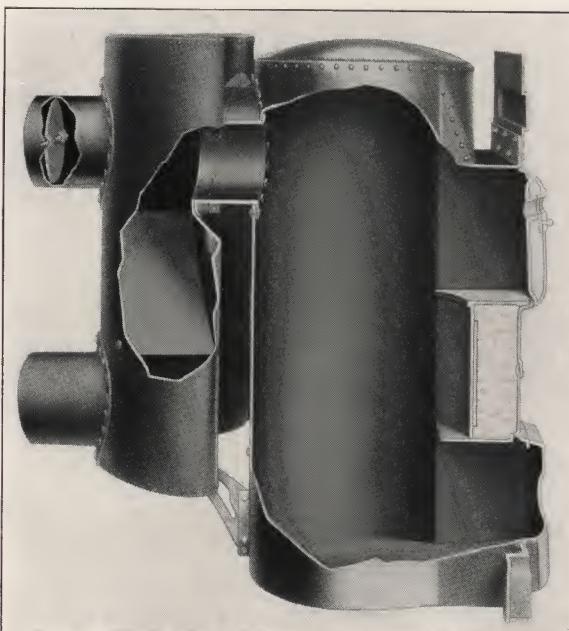


Stoker Fired Model Series 80. Chute openings are 17" wide by 8½" high. Bottom of opening is 4¼" above base of heating element.

OIL BURNING HEATING ELEMENTS OF SERIES NO. 80 SUNBEAM AIR CONDITIONING UNIT



Rotary burner heating element showing cast iron hearth ring set on brackets and sealed with asbestos rope; the hearth plate; hearth plate extension, inner lining of heat-resisting steel, and mineral wool insulation.



Gun burner heating element.

Any standard oil burner — either rotary or gun type — can be used with the Series No. 80 Sunbeam Air Conditioning Unit. Numerous tests and hundreds of installations have demonstrated its high operating efficiency and low consumption of fuel. In the cutaway illustrations at the left can be seen clearly the superiorities of design which make the Oil Burning models of the Sunbeam Air Conditioning Unit, Series No. 80, unexcelled in simplicity and efficiency.

HEATING ELEMENT FOR ROTARY TYPE OIL BURNER

In this model there is available a heating element designed exclusively for rotary oil burner installations.

As shown in the accompanying illustration, this model is provided with a cast ring set into brackets bolted to the heating element. The hearth plate sets on this ring. The space between the steel shell and the ring is packed with asbestos rope to form an air-tight seal to prevent unwanted air from interfering with proper combustion of the burner.

The heating element is protected from impingement of flame by an inner lining of a special heat-resisting steel. Mineral wool, to be packed between the front casting and the front inner lining, as illustrated, is furnished.

This special model simplifies the installation of rotary burners by providing the installer with all the equipment necessary for an air-tight foundation for the hearth. Because of this construction, the Series No. 80 Unit rotary oil burner model has unusually high efficiency and capacity.

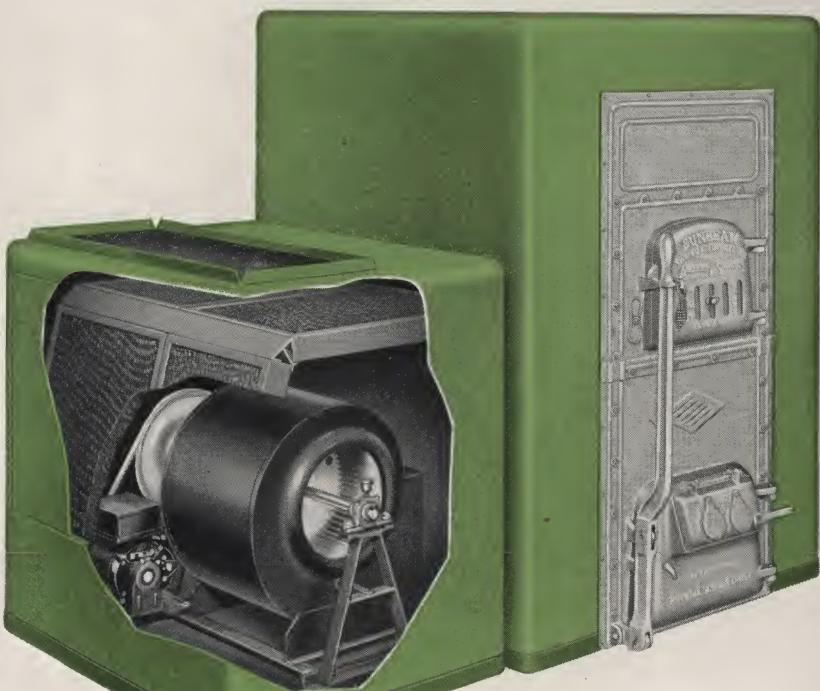
HEATING ELEMENT FOR GUN TYPE OIL BURNER

This model is designed exclusively for gun type oil burners. The feed or upper door is insulated, and equipped with a glass-covered observation opening. The blast tube of the burner is inserted through the opening in the lower door. The base is welded to the sides of heating element forming an air-tight union through which no oil or fumes can escape.

Mineral wool is provided to insulate the space between the front casting and the front inner lining, and the upper and lower doors. It rests on a horizontal plate installed above the lower door and is held in position by a liner of heat-resisting steel, as illustrated.

THE SERIES NO. 5500
SUNBEAM
 AIR CONDITIONING
 UNIT
 •
 OIL OR COAL FIRED

The new Sunbeam Series No. 5500 with steel heating element. Designed for burning coal or oil — with rotary or gun type burners. This illustration shows the coal burning model.



Front view of the new Series 5500 Sunbeam Air Conditioning Unit
 The special rotary oil burner model is shown.

The new Series No. 5500 Sunbeam Air Conditioning Unit supplies the demand for an air conditioner with a steel heating element — at a low price. It measures up to the high Sunbeam standard in performance, durability and attractive appearance.

The finest of material and equipment are used in its manufacture. It has been designed by the same engineers and is constructed by the same skilled mechanics, who have engineered and built the more expensive Sunbeam Air Conditioners which have demonstrated their superior quality through many years of actual service in all types of homes in all parts of the country.

The exterior cabinet is of the same handsome design and green crystalline enamel finish as the Series Nos. 20 and 80, details of which are given on page 3.

A galvanized inner casing keeps the outer casing relatively cool. The heavy boiler plate heating element is both riveted and welded.

Blower, motor, filters, humidifiers and controls used with this Series No. 5500 are illustrated and described on pages 9, 10 and 11.

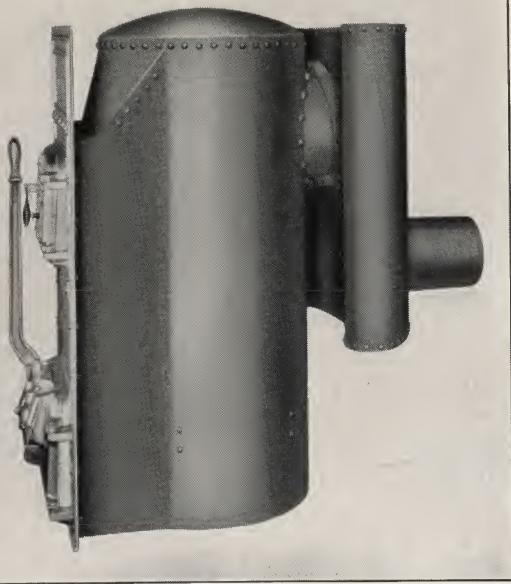
STEEL HEATING ELEMENT SERIES NO. 5500 SUNBEAM

The heating element of the new Series No. 5500 is built to merit the reputation for long life, high heating capacity and trouble-free service that has been established by other Sunbeam Air Conditioners.

It is constructed of heavy boiler plate and is both riveted and welded to permanently withstand the strain of expansion and contraction, and to safeguard against gas leakage. As with the Series No. 80, this heating element is constructed in the new steel fabricating plant of The Fox Furnace Company at Elyria, Ohio. Modern equipment, skilled workmanship and the use of the finest materials assure long life and trouble-free operation of these heating elements.

STOKER FIRED MODEL

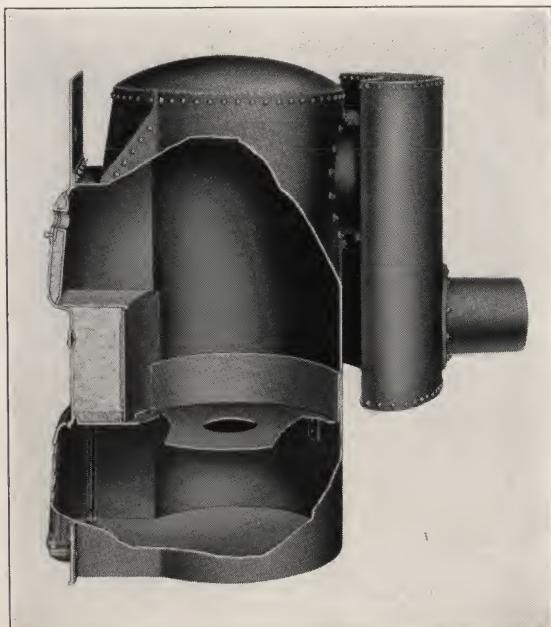
The Stoker Fired Model is equipped with steel chutes on both sides and at rear, so that hopper or bin feed type of virtually any standard make of stoker can be installed without any cutting of the heating element by the installer. Stoker can be installed from front, (through ash pit door) or through the chutes at rear, or right or left sides of heating element. Metal covers and gaskets are provided to seal chutes not used. Bin feed stoker, with screw tube *below* base of unit must be installed in coal hand fired model. Fire brick lining around fire box section and regular coal burning doors are standard equipment. Grate assembly is omitted. See page 5 for illustration and dimensions of chutes.



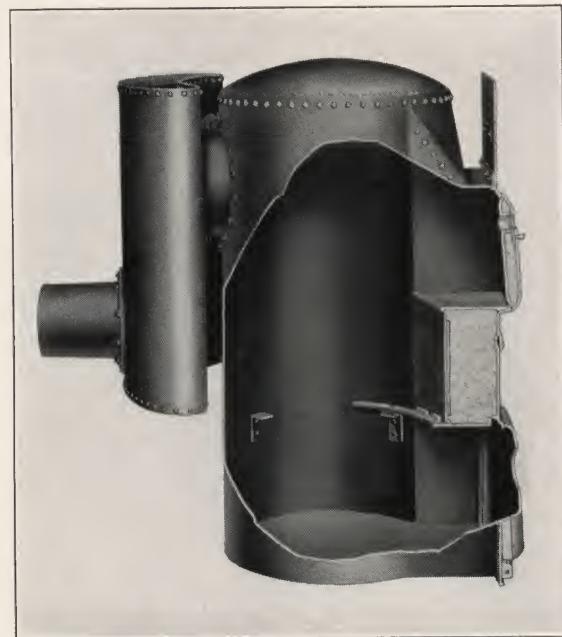
Coal burning model of Series No. 5500

HEATING ELEMENT FOR GUN TYPE OIL BURNER

Any standard make of gun type oil burner can be used in this model of the Series No. 5500. Special doors are provided as shown in the illustrations. The upper door is packed with mineral wool insulation and is equipped with a glass covered opening through which combustion may be observed. Mineral wool, and a horizontal supporting plate for the mineral wool are provided, as illustrated, so that the space between the fire box and cast iron front of heating element can be sealed and insulated.



Rotary burner heating element showing cast iron ring set on brackets and sealed with asbestos rope; the hearth plate, inner lining of heat resisting steel, mineral wool insulation and cast support.



Gun type oil burner heating element.

ROTARY OIL BURNER HEATING ELEMENT

The same special equipment used in the Series No. 80 rotary burner model is also available for the Series No. 5500.

The illustration at the left shows the hearth plate partially cut away to show the cast ring and brackets on which it rests. A seal is formed by wedging asbestos rope between the cast iron ring and the side of the steel shell. An inner lining of special heat resisting steel prevents impingement of flame on the heating element. The space between the feed door opening and the lower door is sealed and insulated with mineral wool and cast supporting plate, as illustrated.

THE BLOWER

These blowers are large, powerful and silent. They operate at low speeds, consuming a minimum of current, and move a large volume of air at low velocities and at comparatively low temperatures. The blower and motor are securely mounted on an integral rigid angle iron frame which prevents vibration and its possible resulting noise. Because of this integral base, pulleys are quickly and easily aligned and remain in alignment indefinitely.

Blowers and motors have extra capacity for summer cooling operation or to overcome greater than average resistance in the ducts. Blowers are equipped with rubber mounted, self-aligning bearings. Large oil reservoirs are provided.

Motors are of the capacitor type, specially designed for air conditioning installations. They do not cause radio interference. Each motor is equipped with a special fuse device which protects it against damage caused by overloading.

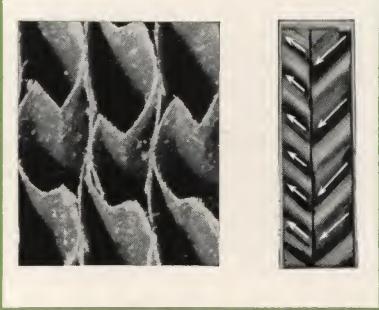
The blower compartment is designed as a complete unit in itself. It can be assembled speedily and inexpensively, and is easily and quickly bolted to the heating compartment. If, for some out-of-the-ordinary installation, a larger blower should be required—for example, a 15 inch blower for a No. 2480 air conditioner which is regularly equipped with a 12 inch blower—the standard 15 inch blower and blower compartment can be substituted. No special heating compartment casings or panels are required for this change.



Blower and motor mounted on integral base. Saves time in aligning pulleys. Large access door is provided for reaching filters, blower and motor. This illustration shows the large amount of Filter surface in Sunbeam Air Conditioners.

AIR FILTERS

These filters combine the two desirable qualifications of high cleaning efficiency and long life. They offer comparatively little resistance to the circulating air after a period of service which finds many other types of filters completely clogged and in need of replacement. Their capacity to hold more dirt, dust, soot, lint, pollen and bacteria—and thus their longer life—is due to the "V" angle construction and to the fact that they can be treated with an unusually large amount of adhesive coating without filling up the passages through which the air must circulate. The accompanying illustration shows the advantages of the "V" angle construction. The air must "turn a corner" in the center of the filter. This turbulence causes all of the air to be wiped against the ample adhesive surfaces of the bottom section, thus removing a maximum of foreign matter. Since the openings in the bottom section are smaller, they are first to fill up. Unlike other makes of filters, the top section will not clog and lose its efficiency while the bottom section remains clean and unused. When clean filters are required, they can be obtained at the cost of ordinary filters.



Top view of section of Sunbeam Filter and a side view showing the "V" angle construction.

SPRAY HUMIDIFIER AND HUMIDITY CONTROL INSTRUMENT

This new type of spray humidifier, automatically controlled by a room humidistat, has proven its ability to properly humidify the air even in those sections where salts, lime, and "hard" water prevent the functioning of other types of humidifiers. When one nozzle does clog, it is turned off and the next one turned on, until all are clogged. All the nozzles are cleaned at one time in a few minutes. Cleaning is needed only a few times during a heating season.

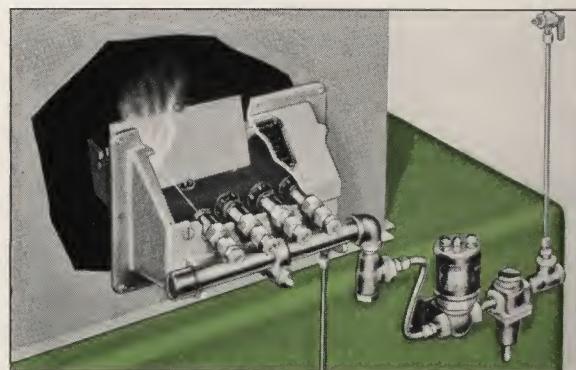
While this humidifier has the capacity to supply satisfactory relative humidity, it also possesses another desirable feature. The amount of water atomized can be adjusted to the air's ability to absorb moisture—and thus prevent condensation in plenum chamber—by changing the position of atomizing plate. The Humidistat controls the solenoid valve in the water line and automatically controls relative humidity just as the thermostat automatically controls temperature. The solenoid

valve is wired so that when Humidistat calls for moisture the solenoid valve cannot open unless blower is running. The blower cannot run unless heat is available in bonnet. Therefore, moisture is never introduced unless there is heat and air movement to absorb and carry away moisture.

The Humidistat is adjustable and can be set to maintain any desired relative humidity.



Humidistat



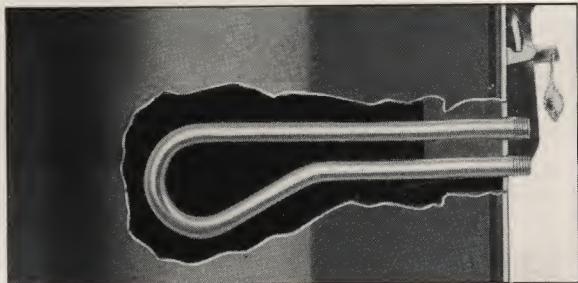
This illustration shows the spray humidifier equipped with four nozzles—the three nozzles not in use are capped to prevent clogging by "salts" precipitation; capacity-adjusting atomizing plate; pressure reducing valve; solenoid valve, 2 strainers, one in front of pressure reducing valve and one back of solenoid valve; and pipe leading from aluminum pan to drain.

DRIP HUMIDIFIER

This apparatus connects to the water line. A thermostatic element expands and contracts with the temperature in the bonnet to admit more or less water to the evaporating reservoir. Humidifier is placed directly above the heating element. The amount of water evaporated by this humidifier is determined largely by temperature in bonnet and not by humidity requirement of living quarters. Humidifier has manual adjustment to vary flow of water into reservoir.



Drip Humidifier



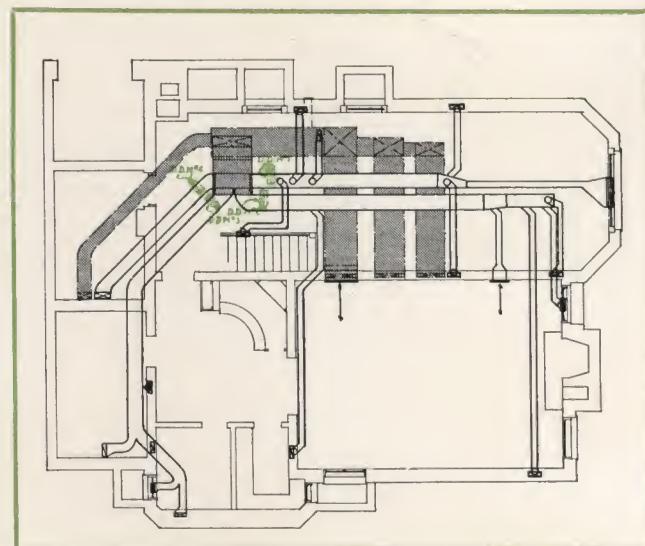
AUXILIARY HOT WATER COILS

Illustrated at the left is the auxiliary hot water coil available for installation in Series Nos. 20, 80 and 5500. This coil will furnish much, if not all, of the hot water required in a home, during the winter months when the Sunbeam is under fire. A durable corrosion-resisting metal is used in its construction. There are no joints which might leak, as the coil is formed of one continuous pipe. The auxiliary hot water coil is installed through openings provided in the front of heating element beside the fire door, as illustrated in the picture opposite.

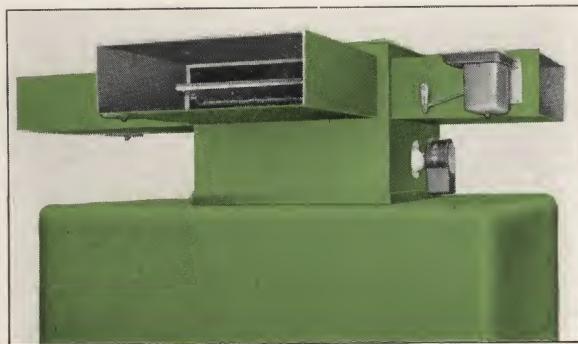
ZONE CONTROL OF TEMPERATURE

In houses of many rooms, or in houses of the rambling type it is generally difficult to maintain an even, uniform temperature in all rooms, whether the heating medium be air or water or steam, when the entire building is controlled by only one thermostat. Zone Control overcomes this difficulty. The house is divided into zones—two or more. A thermostat is placed in one of the rooms in each zone. A Trunk Line or Main Duct with branches leads directly from the Sunbeam Air Conditioning Unit to each zone. A Damper which is operated by a motor is installed in each main duct. When a zone thermostat calls for heat, the duct damper motor opens the damper in the duct which it controls, turns on heat source and blower. When the thermostat is satisfied it closes the damper which it controls, turns off heat source and blower. The heat source is on and blower is operating when any one zone thermostat is demanding heat.

Advantages of Zone Control include, besides uniform, even temperature in every room, quicker response and fuel economy because overheating is avoided. With Zone Control any desired temperature can be maintained in any zone.



A basement layout of a Zone Control Installation. Location of Duct Damper Motors is shown in green.

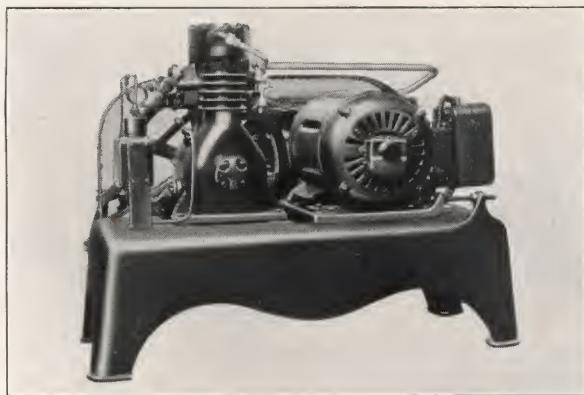


A ZONE CONTROL INSTALLATION

The illustration at left shows how the duct damper motors are installed — one in each main duct leading to each zone. Damper in the front duct is open as is the case when thermostat is demanding heat. When duct damper motor is in open position, it actuates a switch which closes the circuit to source of heat and blower, starting them in operation. When damper motor closes, it opens the circuit to source of heat and blower, stopping them, providing no other damper motor is keeping them in operation.

Notice that duct damper motors are located close to the air conditioning unit.

COOLING AND DEHUMIDIFYING UNIT



Where dehumidification and cooling are desired, the Sunbeam refrigerating unit with cooling coils can be installed in connection with the Sunbeam Winter Air Conditioning Unit. Or if cold water is available it can be circulated through cooling coils. The duct system and registers can be designed and sized to carry warm, conditioned air in winter when the heating plant is operating and also to distribute, cool, conditioned air in summer when the cooling plant is in operation.

Refrigerating equipment may be installed when the Sunbeam Winter (heating) System is installed, or it can be added later.

CONTROL EQUIPMENT

Temperature Control Equipment, for any degree of regulation that may be desired by any home owner, is available with Sunbeam Air Conditioning Units. Control combinations are provided for gas, oil or coal, hand fired or stoker fired. Where the simplest kind of regulation is wanted or where very sensitive regulation is wanted this equipment will provide it most satisfactorily and economically. The individual instruments, which are included in the various combinations, are generally considered the finest available. The proper combination of controls for each and every temperature regulation job is listed in the Price List for Series No. 80, No. 20 and No. 5500 Sunbeam Air Conditioning Units.



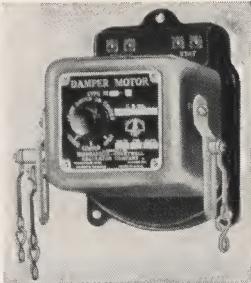
No. T-45, No. T-11-1
and No. T-21
Plain Thermostat



No. T-105-1 and No. 205-1
Night and Day
Electric Clock Thermostat



No. R-155
Control Box



No. M-87-2
Damper Motor



No. R-19-2
Relay



No. L-412-2 and No. L-401-4
Blower Switch



No. L-101-3
Blower and Limit Switch



No. L-101-4 Blower,
Limit and High Cut-in Switch



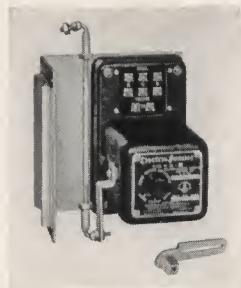
No. H-8
Humidistat



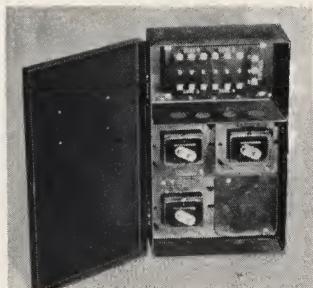
No. V-83
Solenoid Water Valve



No. T-29-1
Night and Day Thermostat
(For Zone Control)



No. M-26-6
Duct Damper Motor
(For Zone Control)



No. A-10 and No. B-10
Power Box
(For Zone Control)



No. L-219-1
High Cut-in Relief Switch
(For Zone Control)

SERIES NO. 20—CAPACITIES—BLOWER - MOTOR - FILTER SPECIFICATIONS

No.	B. T. U. Capacity at Register		Coal Hand Fired		Oil or Stoker Fired		Blower No.	Dia. of Blower Wheel	Pitch Dia. of Blower Pulley	Number of Blowers	Motor H. P.	Motor R.P.M.	Number Filters
	Coal Hand Fired	Oil Fired or Stoker Fired	†C.F.M. Required at 65° F.	†Approx. Blower R.P.M. at $\frac{1}{4}$ " S.P.	†C.F.M. Required at 65° F.	†Approx. Blower R.P.M. at $\frac{1}{4}$ " S.P.							
4420	95,000	108,000	1020	401	1158	430	1-12	12"	12"	1	$\frac{1}{4}$	1725	4 (20"x20")
4820	111,000	126,000	1195	430	1356	459	1-12	12"	12"	1	$\frac{1}{4}$	1725	4 (20"x20")
5220	133,000	150,000	1426	459	1618	487	1-12	12"	12"	1	$\frac{1}{4}$	1725	4 (20"x20")
5620	153,000	173,000	1644	487	1865	516	1-12	12"	12"	1	$\frac{1}{3}$	1725	4 (20"x20")

† Air heated from 65° to 165° F. increases 19% in volume. Therefore, warm air ducts should have capacity for 19% greater C. F. M.

SERIES NO. 20—DIMENSIONS

No.	Overall Width	Height Heating Compartment	Height Blower Compartment	*Depth of Blower Compartment	*Overall Depth	Air Discharge Opening	Air Intake Opening	Smoke Collar Diameter	Approximate Distance from Floor to Center of Smoke Collar
4420	44 $\frac{1}{8}$ "	60"	36 $\frac{1}{4}$ "	29 $\frac{1}{2}$ "	67 $\frac{1}{8}$ "	20"x20"	14"x36 $\frac{1}{2}$ "	9"	45 $\frac{3}{4}$ "
4820	46 $\frac{1}{8}$ "	60"	36 $\frac{1}{4}$ "	29 $\frac{1}{2}$ "	71 $\frac{1}{8}$ "	22"x22"	14"x36 $\frac{1}{2}$ "	9"	45 $\frac{3}{4}$ "
5220	52"	64"	36 $\frac{1}{4}$ "	29 $\frac{1}{2}$ "	75 $\frac{1}{8}$ "	23"x23"	14"x36 $\frac{1}{2}$ "	10"	49 $\frac{1}{4}$ "
5620	56"	64"	36 $\frac{1}{4}$ "	29 $\frac{1}{2}$ "	78 $\frac{1}{8}$ "	24"x24"	14"x36 $\frac{1}{2}$ "	10"	49 $\frac{1}{4}$ "

*Allow clearance in rear equal to depth of blower compartment for removal of filters, blower and motor.

SERIES NO. 80—CAPACITIES—BLOWER - MOTOR - FILTER SPECIFICATIONS

No.	Coal Hand Fired		Coal Stoker Fired		Oil Gun Type Burner		Oil Rotary Burner		Blower No.	Dia. of Blower Wheel	Pitch Dia. of Blower Pulley	No. of Blowers	Motor H.P.	Number Filters
	B. T. U. Capacity at Register	†C.F.M. Required at 65° F.	B. T. U. Capacity at Register	†C.F.M. Required at 65° F.	B. T. U. Capacity at Register	†C.F.M. Required at 65° F.	B. T. U. Capacity at Register	†C.F.M. Required at 65° F.						
†2280	103,000	1112	113,000	1210	117,000	1260	134,000	1441	1-12	12"	12"	1	$\frac{1}{4}$	4 (20"x20")
2480	118,000	1269	129,000	1381	134,000	1439	153,000	1645	1-12	12"	12"	1	$\frac{1}{4}$	4 (20"x20")
2780	155,000	1666	169,000	1814	176,000	1890	201,000	2160	1-15	15"	15"	1	$\frac{1}{3}$	4 (20"x20")
3080	182,000	1962	199,000	2136	207,000	2225	237,000	2543	1-18	18"	15"	1	$\frac{1}{2}$	5 (16"x25")
3480	222,000	2385	242,000	2596	252,000	2705	288,000	3091	1-21	21"	15"	1	$\frac{3}{4}$	6 (16"x25")

† Air heated from 65° to 165° F. increases 19% in volume. Therefore, warm air ducts should have capacity for 19% greater C. F. M. than listed above.

▲ See Sunbeam Blower Capacity table for approximate R. P. M. of blower.

† This size of Unit is not available in the special Stoker-Fired Model.

SERIES NO. 80—DIMENSIONS

No.	*Overall Width	Height Htg. Compartment	Height Blower Compartment	*Width of Blower Compartment	*Overall Depth	Air Discharge Opening	Air Intake Opening	Smoke Collar Diameter	Approximate Distance from Floor to Center of Smoke Collar
2280	73 $\frac{1}{2}$ "	60"	36 $\frac{1}{4}$ "	29 $\frac{1}{2}$ "	43 $\frac{5}{8}$ "	20"x20"	14"x36 $\frac{1}{2}$ "	9"	41 $\frac{3}{4}$ "
2480	75 $\frac{1}{2}$ "	60"	36 $\frac{1}{4}$ "	29 $\frac{1}{2}$ "	46 $\frac{1}{8}$ "	22"x22"	14"x36 $\frac{1}{2}$ "	9"	41 $\frac{3}{4}$ "
2780	82 $\frac{3}{4}$ "	67"	41"	33 $\frac{3}{4}$ "	51 $\frac{5}{8}$ "	25"x25"	16"x45"	10"	43 $\frac{5}{8}$ "
3080	91 $\frac{3}{8}$ "	67"	41"	36 $\frac{5}{8}$ "	54 $\frac{5}{8}$ "	27"x27"	20"x51 $\frac{1}{8}$ "	10"	44 $\frac{1}{4}$ "
3480	101 $\frac{1}{2}$ "	67"	51 $\frac{1}{4}$ "	42 $\frac{1}{2}$ "	58 $\frac{1}{2}$ "	32"x32"	24"x55"	10"	45 $\frac{1}{4}$ "

*Smoke Pipe Tee extends out approximately 28" additional in Nos. 2280 and 2480, and 36" in larger sizes.

*Allow clearance at side equal to width of blower compartment for removal of filters, blower and motor.

SERIES NO. 5500—CAPACITIES—BLOWER - MOTOR - FILTER SPECIFICATIONS

No.	Coal Hand Fired		Coal Stoker Fired		Oil Gun Type Burner		Oil Rotary Burner		Blower No.	Dia. of Blower Wheel	Pitch Dia. of Blower Pulley	No. of Blowers	Motor H.P.	Number Filters
	B.T.U. Capacity at Register	†C.F.M. Required at 65° F.	B.T.U. Capacity at Register	†C.F.M. Required at 65° F.	B.T.U. Capacity at Register	†C.F.M. Required at 65° F.	B.T.U. Capacity at Register	†C.F.M. Required at 65° F.						
†5520	76,000	815	83,000	888	86,000	924	98,000	1057	1-9	9 $\frac{1}{4}$ "	12"	1	$\frac{1}{4}$	2-16"x25"
5522	89,000	956	97,000	1041	101,000	1085	115,000	1240	1-12	12"	12"	1	$\frac{1}{4}$	4-20"x20"
5524	104,000	1114	113,000	1213	118,000	1264	134,000	1444	1-12	12"	12"	1	$\frac{1}{4}$	4-20"x20"
5527	132,000	1415	143,000	1541	149,000	1605	171,000	1835	1-12	12"	12"	1	$\frac{3}{4}$	4-20"x20"

† Air heated from 65° to 165° F. increases 19% in volume. Therefore, warm air ducts should have capacity for 19% greater C. F. M. than listed above.

▲ See Sunbeam Blower Capacity table for approximate R. P. M. of blower.

† These sizes are not available in the special Stoker-Fired Model.

SERIES NO. 5500—DIMENSIONS

No.	*Overall Width	Height Heating Compartment	Height Blower Compartment	Width of Blower Compartment	Overall Depth	Air Discharge Opening	Air Intake Opening	Smoke Collar Diameter	Approximate Distance from Floor to Center of Smoke Collar
5520	65 $\frac{3}{8}$ "	58"	28 $\frac{1}{4}$ "	26 $\frac{1}{8}$ "	38 $\frac{1}{4}$ "	18"x18"	10"x28 $\frac{1}{2}$ "	8"	24 $\frac{3}{4}$ "
5522	69 $\frac{1}{2}$ "	58"	36 $\frac{1}{4}$ "	29 $\frac{1}{2}$ "	41"	20"x20"	14"x36 $\frac{1}{2}$ "	8"	24 $\frac{3}{4}$ "
5524	73 $\frac{1}{2}$ "	58"	36 $\frac{1}{4}$ "	29 $\frac{1}{2}$ "	43 $\frac{1}{2}$ "	22"x22"	14"x36 $\frac{1}{2}$ "	8"	24 $\frac{3}{4}$ "
5527	77 $\frac{1}{2}$ "	61"	36 $\frac{1}{4}$ "	29 $\frac{1}{2}$ "	48 $\frac{1}{2}$ "	23"x23"	14"x36 $\frac{1}{2}$ "	9"	24"

*Allow clearance at side equal to width of blower compartment for removal of filters, blower and motor.

**Monthly Payments
For Replacement Jobs**

The SUNBEAM Finance Plan enables your customers to pay for new heating and air conditioning systems in small monthly payments.

TRADE PRICES

F. O. B. Elyria, Ohio

Effective January 1, 1938

Replacing List Dated July 1, 1937

SUNBEAM

AIR CONDITIONING UNIT

SERIES No. 20, No. 80
and No. 5500

SERIES No. 20, CAST IRON HEATING ELEMENT—SQUARE CASING

No.	B. T. U. Capacity at Register		Approx. Ship. Wt. in Lbs.	Net Price Crystalline Enamel Casing
	Coal Hand Fired	Oil Fired or Stoker Fired		
4420	95,000	108,000	1527	\$143.25
4820	111,000	126,000	1692	153.25
5220	133,000	150,000	2040	173.75
5620	153,000	173,000	2197	193.75

Duplex grates are standard equipment.

STANDARD EQUIPMENT: *Prices above include*—

1. 1000 Series cast furnace. Vapor pan will be furnished when specified. When vapor pan is not specified, a plate will be furnished to cover the vapor pan opening.
2. Square outer casing.
3. Inner casing.
4. Blower compartment.
5. Blower.
6. Belt and pulleys.
7. Rubber mounted motor, capacitor type.
8. Air filters.

NOTE—Position of Blower Compartment at rear of heating compartment cannot be changed. See electrical specifications on Page 2.

SERIES No. 80, STEEL HEATING ELEMENT—SQUARE CASING

No.	B. T. U. Capacity at Register		Approx. Ship. Wt. in Lbs.	Net Price Crystalline Enamel Casing		
	Coal Hand Fired	Coal Stoker Fired				
2280	103,000	121,000	117,000	134,000	1603	\$161.00
2480	118,000	138,000	134,000	153,000	1698	174.50
2780	155,000	181,000	176,000	201,000	2110	227.00
3080	182,000	213,000	207,000	237,000	2194	259.25
3480	222,000	259,000	252,000	288,000	2468	305.75

STANDARD EQUIPMENT: *Prices above include*—

1. Steel Heating Element (including smoke tee).
2. Square outer casing.
3. Inner casing.
4. Blower compartment.
5. Blower.
6. Belt and pulleys.
7. Rubber mounted motor, capacitor type.
8. Air filters.

Oil Burning: When an oil burner is to be used, a specially designed Rotary type oil burner model or Gun type model will be furnished. In ordering, add letter "R" for Rotary type model which includes cast iron hearth ring and brackets, hearth plate, fire box liners, mineral wool insulation and special doors — for example No. 2280-R. Add letter "G" for Gun type oil burner model which includes special doors, front fire box liner, mineral wool insulation and supporting plate for insulation — for example No. 2280-G. When either of these special oil burning models is furnished no deduction is allowed for omission of grate assembly.

Stoker Fired: When a stoker is to be installed from rear, right side, or left side in No. 2480 and larger sizes the special stoker fired model can be furnished. This model is equipped with 3 steel chutes through any one of which stoker screw tube can enter heating element. Metal plates, and gaskets, are provided to seal chutes not used. Fire brick lining and supports, regular coal burning doors and fronts, damper, counterweight, chain and pulleys are furnished. Grate assembly, for which no deduction is allowed, is omitted. In ordering, add letter "S"; for example, "No. 2480-S."

NOTE—When stoker is installed at front, or when stoker screw tube is below furnace base, coal, hand-fired model must be used.

NOTE—Blower compartments on the Series No. 80 can be attached to either right or left side of heating compartment. See electrical specifications on Page 2.

SERIES No. 5500, STEEL HEATING ELEMENT—SQUARE CASING

No.	B. T. U. Capacity at Register		Approx. Ship. Wt. in Lbs.	Net Price Crystalline Enamel Casing		
	Coal Hand Fired	Coal Stoker Fired				
5520	76,000	88,000	86,000	98,000	1248	\$134.25
5522	89,000	104,000	101,000	115,000	1360	141.25
5524	104,000	121,000	118,000	134,000	1410	151.75
5527	132,000	154,000	149,000	171,000	1625	176.75

STANDARD EQUIPMENT: *Prices above include*—

1. Steel Heating Element.
2. Square outer casing.
3. Inner casing.
4. Blower compartment.
5. Blower.
6. Belt and pulleys.
7. Rubber mounted motor, capacitor type.
8. Air filters.

Oil Burning: When an oil burner is to be used, a specially designed Rotary type oil burner model or Gun type model will be furnished. In ordering, add letter "R" for Rotary type model which includes cast iron hearth ring and brackets, hearth plate, fire box liners, mineral wool insulation and special doors — for example No. 5520-R. Add letter "G" for Gun type oil burner model which includes special doors, mineral wool insulation, front fire box liner and supporting plate for insulation — for example No. 5520-G. When either of these special oil burning models is furnished no deduction is allowed for omission of grate assembly.

Stoker Fired: When a stoker is to be installed from rear, right side, or left side in No. 5524 and No. 5527 the special stoker fired model can be furnished. This model is equipped with 3 steel chutes through any one of which stoker screw tube can enter heating element. Metal plates, and gaskets, are provided to seal chutes not used. Fire brick lining and supports, regular coal burning doors and fronts are furnished. Grate assembly, for which no deduction is allowed, is omitted. In ordering, add letter "S"; for example, "No. 5524-S."

NOTE—When stoker is installed at front, or when stoker screw tube is below furnace base, coal, hand-fired model must be used.

NOTE—Blower compartment on the Series No. 5500 can be attached to either right or left side of heating compartment. See electrical specifications on Page 2.

THE FOX FURNACE COMPANY • ELYRIA, OHIO

A DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION

Temperature Control Prices on pages 2, 3, 4 and 5

Page 1

Humidifying Equipment Prices on Page 5

DEDUCTION FOR GRATE ASSEMBLY AND ASH PIT DOOR, SERIES No. 20 ONLY

Deduct from Net Price

No. 4020
\$2.50

No. 4420
\$3.00

No. 4820
\$3.50

No. 5220
\$4.00

No. 5620
\$4.50

ELECTRICAL SPECIFICATIONS

BLOWER MOTORS

STANDARD Motors are for 110-V. 60 Cycle, single phase Alternating Current.

Motors for 220-V. 60 Cycle single phase Alternating Current will be furnished without additional charge.

Motors other than listed above can be furnished at an additional charge.

Direct Current Motors require a filter to eliminate radio interference; furnished at an additional charge.

CONTROLS

We assume no responsibility for Sunbeam Air Conditioning Units, Coal Burning Hand Fired, that are equipped with Controls that are not furnished by The Fox Furnace Company.

Standard controls are for 110-V. 60 Cycle single phase Alternating Current.

110-V. 60 Cycle single phase Alternating Current Controls can be used with 220-V. 60 Cycle single phase Alternating Current Blower Motors by running a 110-V. line to controls and a 220-V. line to the blower motor.

When 220-V. 60 Cycle single phase Alternating Current Motors are used with Control Combinations C-1x, C-2x, D-1x, D-2x, E-1x and F-1x we will furnish a No. R-48 Relay for which there will be an additional charge of \$5.00.

Control Combinations for other than 110-V. 60 Cycle single phase Alternating Current can be furnished at an additional charge.

ADDITIONAL FOR BLOWER SWITCH

No. L-412-2 Blower Switch—Single Pole..... Net Price \$8.00

When temperature controls are not used, a blower switch is necessary for starting and stopping blower, when bonnet temperature rises or falls. When temperature controls as listed on the pages following are used, blower switch is included in temperature control equipment.

TEMPERATURE CONTROL EQUIPMENT

Wiring Diagram will be furnished with each Control Combination

All of the following control combinations are for 110 V. 60 Cycle, single phase, Alternating Current.

110 V. controls can be used with 220 V. 60 Cycle, single phase, Alternating Current blower motors.

If combinations C-1x, C-2x, D-1x, D-2x, E-1x or F-1x are used with a 220 V. blower motor it is necessary to use a No. R-48 Relay for which there is an additional charge of \$5.00.

COAL BURNING • HAND-FIRED • BLOWER SWITCH CONTROL OF BLOWER

COMBINATION		NET PRICE
B-1x	No. T-45 Plain Thermostat. No. M-87-2 Damper Motor, including transformer, chain, S hooks and pulleys. No. L-101-3 Blower and Limit Switch (Furnacestat).	\$34.75
B-2x	No. T-105-1 Night and Day Electric Clock Thermostat and Transformer (Chronotherm). No. M-87-2 Damper Motor, including transformer, chain, S hooks and pulleys. No. R-19-2 Relay. No. L-101-3 Blower and Limit Switch (Furnacestat).	\$63.75

COAL BURNING • HAND-FIRED • WINTER AND SUMMER THERMOSTAT CONTROL OF BLOWER

COMBINATION		NET PRICE
C-1x	No. T-11-1 Plain Thermostat (Acratherm). No. M-87-2 Damper Motor, including transformer, chain, S hooks and pulleys. No. L-101-4 Blower, Limit and High Cut in Switch (Furnacestat). No. R-155 Control Box. (See description on page 5.)	\$51.00
C-2x	No. T-105-1 Night and Day Electric Clock Thermostat and Transformer (Chronotherm). No. M-87-2 Damper Motor, including transformer, chain, S hooks and pulleys. No. L-101-4 Blower, Limit and High Cut In Switch (Furnacestat). No. R-155 Control Box. (See description on page 5.)	\$73.75

Prices F. O. B. Elyria, Ohio.

No freight allowance.

Prices subject to change without notice.

Terms—2% Cash Discount for payment 10th of month following shipment—
due Net last of month following shipment.

To the price and terms quoted, add any manufacturers' or sales tax payable under any effective statute.

OIL BURNING OR STOKER-FIRED • BLOWER SWITCH CONTROL OF BLOWER

Controls regularly furnished with oil burner or stoker should be used and wired according to wiring diagram furnished by oil burner or stoker manufacturer.

We will furnish on request a wiring diagram showing how to wire the blower switch and spray humidifier, if used, which wiring will be independent of oil burner or stoker wiring.

No. L-412-2 Blower Switch..... Net Price \$8.00

OIL BURNING OR STOKER-FIRED • WINTER AND SUMMER THERMOSTAT CONTROL OF BLOWER

OIL BURNER dealer should furnish and wire according to wiring diagram furnished by oil burner manufacturer, all controls he furnishes regularly, with the exception of the thermostat, and limit switch.

We will furnish wiring diagram covering controls furnished by us.

This control combination is not satisfactory and should not be used with an oil burner employing the constant variable flame principle.

If a constant flame oil burner is used, blower switch control of blower should be used.

STOKER dealer should supply Hold Fire Control.

WHEN ORDERING CONTROLS, specify make of stoker and stoker controls to be used, and the name or number by which the manufacturer identifies the controls. For example: "Freeman Stoker with Minneapolis-Honeywell R-183-A Stoker Relay." We will be able to supply, in most cases, a complete wiring diagram which will show the proper method of wiring both our controls and stoker controls.

If names of stoker and stoker controls are not known when order is placed, we will furnish wiring diagram covering controls furnished by us, with instructions as to how to tie in our controls with stoker controls.

NOTE: Zone control equipment is not satisfactory and should not be used with a stoker employing the variable coal feed principle.

COMBINATION	NET PRICE
D-1x	\$35.00
COMBINATION	NET PRICE
D-2x	\$57.75

COAL BURNING • HAND-FIRED • WINTER AND SUMMER THERMOSTAT CONTROL OF BLOWER WITH ZONE CONTROL

Zone Control Equipment Must Be Added to This Equipment
(See Zone Control Equipment Listed on Page 4)

COMBINATION	NET PRICE
E-1x	\$51.00

*No. T-11-1 Plain Thermostat (Acratherm).

No. M-87-2 Damper Motor including transformer, chain, S hooks and pulleys.

No. L-101-4 Blower, Limit and High Cut In Switch (Furnacestat.)

No. R-155 Control Box. (See description on page 5.)

*Note: The T-11-1 Plain Thermostat listed above is used for summer control of blower only. Zone control thermostats are inoperative in summer. If summer control of blower is not required, deduct \$5.00 from \$51.00, giving a net price of \$46.00.

OIL BURNING OR STOKER-FIRED • WINTER AND SUMMER THERMOSTAT CONTROL OF BLOWER WITH ZONE CONTROL

Zone Control Equipment Must Be Added to This Equipment
(See Zone Control Equipment listed on page 4)

OIL BURNER dealer should furnish and wire according to wiring diagram furnished by oil burner manufacturer, all controls he furnishes regularly, with the exception of the thermostat, and limit switch.

We will furnish wiring diagram covering controls furnished by us.

Zone control equipment is not satisfactory and should not be used with an oil burner employing the constant variable flame principle.

STOKER dealer should supply Hold Fire Control.

WHEN ORDERING CONTROLS, specify make of stoker and stoker controls to be used, and the name or number by which the manufacturer identifies the controls. For example: "Freeman Stoker with Minneapolis-Honeywell R-183-A Stoker Relay." We will be able to supply, in most cases, a complete wiring diagram which will show the proper method of wiring both our controls and stoker controls.

If names of stoker and stoker controls are not known when order is placed, we will furnish wiring diagram covering controls furnished by us, with instructions as to how to tie in our controls with stoker controls.

NOTE: Zone control equipment is not satisfactory and should not be used with a stoker employing the variable coal feed principle.

COMBINATION	NET PRICE
F-1x	\$35.00

*Note: The T-11-1 Plain Thermostat listed above is used for summer control of blower only. Zone control thermostats are inoperative in summer. If summer control of blower is not required, deduct \$5.00 from \$35.00, giving a net price of \$30.00.

ZONE CONTROL EQUIPMENT

**Equipment Listed is for Each Zone. If Three Zones are used it is necessary to Order Three Combinations
in Addition to the Control Equipment Shown in Combination E-1x or F-1x**

To be Used When Night and Day Thermostats are NOT USED

The G-1Ax Combination has a power box having sufficient space for four transformers, and a panel provided with terminals for centralized wiring. If four zones (including relief zone if one is used) or less are used only one G-1Ax is necessary. An additional G-1Ax is necessary for five to eight zones, etc.

COMBINATION		NET PRICE
G-1Ax	No. T-21 Plain Thermostat (Acratherm). No. M-26-6 Duct Damper Motor including fittings, transformer, switch and terminal posts. No. A-10 Power Box for duct damper motor transformers, and wire terminal posts.	\$33.50

One G-1Bx Combination is necessary regardless of the number of zones used unless a separate relief zone is used (Combination G-3x) in which event Combination G-1Bx is not necessary.

COMBINATION		NET PRICE
G-1Bx	No. T-21 Plain Thermostat (Acratherm). No. M-26-6 Duct Damper Motor including fittings, transformer, switch and terminal posts. No. L-219-1 High Cut In Relief Switch (Airstat).	\$29.75

COMBINATION		NET PRICE
G-1Cx	No. T-21 Plain Thermostat (Acratherm). No. M-26-6 Duct Damper Motor including fittings, transformer, switch and terminal posts.	\$24.00

To Be Used Where a Zone Thermostat Controls More Than One Duct Damper Motor

COMBINATION		NET PRICE
G-1-2Dx	No. M-26-6 Duct Damper Motor including fittings, transformer and terminal posts.	\$17.50

Relief Zone

COMBINATION		NET PRICE
G-3x	No. M-26-6 Duct Damper Motor including fittings, transformer, switch and terminal posts. No. L-219-1 High Cut In Relief Switch (Airstat).	\$23.25

To be Used When Night and Day Thermostats ARE USED

The G-2Ax Combination has a power box having sufficient space for four transformers and a panel provided with terminals for centralized wiring and day and night control relay. If four zones (including relief zone if one is used) or less are used only one G-2Ax is necessary. An additional G-2Ax is necessary for five to eight zones, etc.

COMBINATION		NET PRICE
G-2Ax	No. T-205-1 Night and Day Electric Clock Thermostat, Switch and Transformer (Chronotherm). No. M-26-6 Duct Damper Motor including fittings, transformer, switch and terminal posts. No. B-10 Power Box for duct damper motor transformers, wire terminal posts and day and night control relay.	\$72.50

One G-2Bx Combination is necessary regardless of the number of zones used unless a separate relief zone is used (Combination G-3x) in which event Combination G-2Bx is not necessary.

COMBINATION		NET PRICE
G-2Bx	No. T-29-1 Night and Day Twin Thermostat. No. M-26-6 Duct Damper Motor including fittings, transformer, switch and terminal posts. No. L-219-1 High Cut In Relief Switch (Airstat).	\$35.25

COMBINATION		NET PRICE
G-2Cx	No. T-29-1 Night and Day Twin Thermostat. No. M-26-6 Duct Damper Motor including fittings, transformer and terminal posts.	\$29.75

To Be Used Where a Zone Thermostat Controls More Than One Duct Damper Motor

COMBINATION		NET PRICE
G-1-2Dx	No. M-26-6 Duct Damper Motor including fittings, transformer and terminal posts.	\$17.50

Relief Zone

No. M-26-6 Duct Damper Motor including fittings, transformer, switch and terminal posts.
No. L-219-1 High Cut In Relief Switch (Airstat).

COMBINATION		NET PRICE
G-3x	No. M-26-6 Duct Damper Motor including fittings, transformer, switch and terminal posts. No. L-219-1 High Cut In Relief Switch (Airstat).	\$23.25

HUMIDIFYING EQUIPMENT

AUTOMATIC SPRAY HUMIDIFIER

COMBINATION

H-4x

- No. H/8 Friez Humidistat.
 No. V-83 Solenoid Water Valve, including transformer.
 Two No. 390 Water Strainers.
 No. A-320 Pressure Reducing Water Valve.
 No. 50 Humidifier including:
 Copper tubing and fittings.
 Shut-off Valve.
 4 Spray Nozzles with individual shut-off valves.
 Aluminum spray pan with capacity adjusting plate.
 Nozzle cleaning rod.
 3 Rubber Caps for Spray Nozzles not in use.

NET PRICE
\$31.50

DRIP HUMIDIFIER

COMBINATION

Za

- Expansion Element Vapor Pan
 Copper Tubing and Fittings

NET PRICE
\$9.50

IMPORTANT:—Always specify the number of the Sunbeam Unit with which Drip Humidifier will be used so proper piping and fittings will be provided.

NOTE: *Cable is furnished for Thermostats and Humidistats.*

AIR FILTERS

Filters (size 20" x 20" or 16" x 25") each

(Full freight is allowed to any point east of the Rocky Mountains for a gross or more of filters.)

NET PRICE
\$1.00

WATER PAN

NET PRICE
\$2.50

Water Pan with Cast Iron Frame that attaches to Casing.
 (For No. 80 and No. 5500 Series only.)

*AUXILIARY WATER HEATER COILS

No. of Coil	For Units	Approximate Shipping Weight	Net Price
No. 1" x 24" Straight	No. 4420	7 lbs.	\$1.00
No. 1" x 26" Straight	No. 4820, 5220, 3480	7½ lbs.	1.00
No. 1" x 30" Straight	No. 5620	8½ lbs.	1.20
No. 1 Formed	No. 2480, 5522, 5524	7½ lbs.	2.50
No. 2 Formed	No. 2780, 3080, 5527	7 lbs.	2.70
No. 3 Formed	No. 2280, 5520	6½ lbs.	2.45

* In ordering, be sure to specify the size of coil and the unit to which it is to be connected. For example, 1" x 30" Straight Coil for No. 5620 Air Conditioning Unit.

No. R-155 CONTROL BOX

Control Box should be attached to the basement wall. It measures 6" wide x 5¾" high x 3¾" deep.
 No wire to connect control box to controls and blower motor is furnished with the exception of thermostat and humidistat cable.

Control Box contains a transformer for thermostat-relay circuit, and a panel provided with terminals for centralized wiring. A three wire Series 10 thermostat is the standard to be used with this box.

An additional power transformer mounted outside the box is furnished when a damper motor is used. Another transformer also mounted outside the box is furnished for the solenoid water valve. Another transformer mounted outside the box is furnished for the electric clock thermostat.

When zone control equipment is used a separate transformer is furnished for each duct damper motor. Duct damper motor transformers are mounted in either No. A-10 or No. B-10 power boxes.

Relay in control box has sufficient capacity to start a 1-H.P. motor of either the capacitor or repulsion induction type, using 110 or 220 V., 60 cycle, single phase, Alternating Current.

A switch is located on the face of the control box. This switch permits thermostat control of the blower motor in summer. It also opens circuit to heating equipment in summer.

SERIES No. 20 — CAPACITIES — BLOWER-MOTOR-FILTER SPECIFICATIONS

No.	B. T. U. Capacity at Register		Coal Hand Fired		Oil or Stoker Fired		Blower No.	Dia. of Blower Wheel	Pitch Dia. of Blower Pulley	Number of Blowers	Motor H.P.	Motor R.P.M.	Number Filters
	Coal Hand Fired	Oil Fired or Stoker Fired	†C.F.M. Required at 65° F.	Approx. Blower R.P.M. at $\frac{1}{4}$ ' S.P.	†C.F.M. Required at 65° F.	Approx. Blower R.P.M. at $\frac{1}{4}$ ' S.P.							
4420	95,000	108,000	1020	401	1158	430	1-12	12"	12"	1	$\frac{1}{4}$	1725	4 (20'x20")
4820	111,000	126,000	1195	430	1356	459	1-12	12"	12"	1	$\frac{1}{4}$	1725	4 (20'x20")
5220	133,000	150,000	1426	459	1618	487	1-12	12"	12"	1	$\frac{1}{4}$	1725	4 (20'x20")
5620	153,000	173,000	1644	487	1865	516	1-12	12"	12"	1	$\frac{1}{3}$	1725	4 (20'x20")

† Air heated from 65° to 165° F. increases 19% in volume. Therefore, warm air ducts should have capacity for 19% greater C. F. M.

SERIES No. 20 — DIMENSIONS

No.	Overall Width	Height Heating Compartment	Height Blower Compartment	*Depth of Blower Compartment	*Overall Depth	Air Discharge Opening	Air Intake Opening	Smoke Collar Diameter	Approximate Distance from Floor to Center of Smoke Collar
4420	44 $\frac{1}{2}$ "	60"	36 $\frac{1}{4}$ "	29 $\frac{1}{2}$ "	67 $\frac{1}{8}$ "	20"x20"	14"x36 $\frac{1}{2}$ "	9"	45 $\frac{3}{4}$ "
4820	46 $\frac{1}{2}$ "	60"	36 $\frac{1}{4}$ "	29 $\frac{1}{2}$ "	71 $\frac{7}{8}$ "	22"x22"	14"x36 $\frac{1}{2}$ "	9"	45 $\frac{3}{4}$ "
5220	52"	64"	36 $\frac{1}{4}$ "	29 $\frac{1}{2}$ "	75 $\frac{7}{8}$ "	23"x23"	14"x36 $\frac{1}{2}$ "	10"	49 $\frac{1}{4}$ "
5620	56"	64"	36 $\frac{1}{4}$ "	29 $\frac{1}{2}$ "	78 $\frac{7}{8}$ "	24"x24"	14"x36 $\frac{1}{2}$ "	10"	49 $\frac{1}{4}$ "

▲ Allow clearance in rear equal to depth of blower compartment for removal of filters, blower and motor.

SERIES No. 80 — CAPACITIES — BLOWER-MOTOR-FILTER SPECIFICATIONS

No.	Coal Hand Fired		Coal Stoker Fired		Oil Gun Type Burner		Oil Rotary Burner		Blower No.	Dia. of Blower Wheel	Pitch Dia. of Blower Pulley	No. of Blowers	Motor H.P.	Number Filters
	B. T. U. Capacity at Register	†C. F. M. Required at 65° F.	B. T. U. Capacity at Register	†C. F. M. Required at 65° F.	B. T. U. Capacity at Register	†C. F. M. Required at 65° F.	B. T. U. Capacity at Register	†C. F. M. Required at 65° F.						
†2280	103,000	1112	113,000	1210	117,000	1260	134,000	1441	1-12	12"	12"	1	$\frac{1}{4}$	4(20'x20")
2480	118,000	1269	129,000	1381	134,000	1439	153,000	1645	1-12	12"	12"	1	$\frac{1}{4}$	4(20'x20")
2780	155,000	1666	169,000	1814	176,000	1890	201,000	2160	1-15	15"	15"	1	$\frac{1}{3}$	4(20'x20")
3080	182,000	1962	199,000	2136	207,000	2225	237,000	2543	1-18	18"	15"	1	$\frac{1}{2}$	5(16'x25")
3480	222,000	2385	242,000	2596	252,000	2705	288,000	3091	1-21	21"	15"	1	$\frac{3}{4}$	6(16'x25")

† Air heated from 65° to 165° F. increases 19% in volume. Therefore, warm air ducts should have capacity for 19% greater C. F. M. than listed above.

▲ See Sunbeam Blower Capacity table for approximate R. P. M. of blower.

† This size of Unit is not available in the special Stoker-Fired Model.

SERIES No. 80 — DIMENSIONS

No.	*Overall Width	Height Heating Compartment	Height Blower Compartment	*Width of Blower Compartment	*Overall Depth	Air Discharge Opening	Air Intake Opening	Smoke Collar Diameter	Approximate Distance from Floor to Center of Smoke Collar
2280	73 $\frac{1}{2}$ "	60"	36 $\frac{1}{4}$ "	29 $\frac{1}{2}$ "	43 $\frac{5}{8}$ "	20"x20"	14"x36 $\frac{1}{2}$ "	9"	41 $\frac{3}{4}$ "
2480	75 $\frac{1}{2}$ "	60"	36 $\frac{1}{4}$ "	29 $\frac{1}{2}$ "	46 $\frac{1}{8}$ "	22"x22"	14"x36 $\frac{1}{2}$ "	9"	41 $\frac{3}{4}$ "
2780	82 $\frac{3}{4}$ "	67"	41"	33 $\frac{3}{4}$ "	51 $\frac{7}{8}$ "	25"x25"	16"x45"	10"	43 $\frac{5}{8}$ "
3080	91 $\frac{1}{2}$ "	67"	41"	36 $\frac{3}{8}$ "	54 $\frac{5}{8}$ "	27"x27"	20"x51 $\frac{7}{8}$ "	10"	44 $\frac{1}{4}$ "
3480	101 $\frac{1}{2}$ "	67"	51 $\frac{1}{4}$ "	42 $\frac{1}{2}$ "	58 $\frac{1}{2}$ "	32"x32"	24"x55"	10"	45 $\frac{1}{4}$ "

* Smoke Pipe Tee extends out approximately 28" additional in Nos. 2280 and 2480, and 36" in larger sizes.

▲ Allow clearance at side equal to width of blower compartment for removal of filters, blower and motor.

SERIES No. 5500 — CAPACITIES — BLOWER-MOTOR-FILTER SPECIFICATIONS

No.	Coal Hand Fired		Coal Stoker Fired		Oil Gun Type Burner		Oil Rotary Burner		Blower No.	Dia. of Blower Wheel	Pitch Dia. of Blower Pulley	No. of Blowers	Motor H.P.	Number Filters
	B. T. U. Capacity at Register	†C. F. M. Required at 65° F.	B. T. U. Capacity at Register	†C. F. M. Required at 65° F.	B. T. U. Capacity at Register	†C. F. M. Required at 65° F.	B. T. U. Capacity at Register	†C. F. M. Required at 65° F.						
†5520	76,000	815	83,000	888	86,000	924	98,000	1057	1- 9	9 $\frac{1}{4}$ "	12"	1	$\frac{1}{4}$	2 (16'x25")
†5522	89,000	956	97,000	1041	101,000	1085	115,000	1240	1-12	12"	12"	1	$\frac{1}{4}$	4 (20'x20")
5524	104,000	1114	113,000	1213	118,000	1264	134,000	1444	1-12	12"	12"	1	$\frac{1}{4}$	4 (20'x20")
5527	132,000	1415	143,000	1541	149,000	1605	171,000	1835	1-12	12"	12"	1	$\frac{3}{4}$	4 (20'x20")

† Air heated from 65° to 165° F. increases 19% in volume. Therefore, warm air ducts should have capacity for 19% greater C. F. M. than listed above.

▲ See Sunbeam Blower Capacity table for approximate R. P. M. of blower.

† These sizes are not available in the special Stoker-Fired Model.

SERIES No. 5500 — DIMENSIONS

No.	*Overall Width	Height Heating Compartment	Height Blower Compartment	*Width of Blower Compartment	Overall Depth	Air Discharge Opening	Air Intake Opening	Smoke Collar Diameter	Approximate Distance from Floor to Center of Smoke Collar
5520	65 $\frac{5}{8}$ "	58"	28 $\frac{1}{4}$ "	26 $\frac{7}{8}$ "	38 $\frac{1}{4}$ "	18"x18"	10"x28 $\frac{1}{2}$ "	8"	24 $\frac{3}{4}$ "
5522	69 $\frac{1}{2}$ "	58"	36 $\frac{1}{4}$ "	29 $\frac{1}{2}$ "	41"	20"x20"	14"x36 $\frac{1}{2}$ "	8"	24 $\frac{3}{4}$ "
5524	73 $\frac{3}{4}$ "	58"	36 $\frac{1}{4}$ "	29 $\frac{1}{2}$ "	43 $\frac{1}{2}$ "	22"x22"	14"x36 $\frac{1}{2}$ "	8"	24 $\frac{3}{4}$ "
5527	77 $\frac{1}{2}$ "	61"	36 $\frac{1}{4}$ "	29 $\frac{1}{2}$ "	48 $\frac{1}{2}$ "	23"x23"	14"x36 $\frac{1}{2}$ "	9"	24"

▲ Allow clearance at side equal to width of blower compartment for removal of filters, blower and motor.

DESIGNED EXCLUSIVELY FOR STOKER FIRING

THE NEW SERIES "S"

SUNBEAM
Stoker Fired
AIR CONDITIONING UNIT



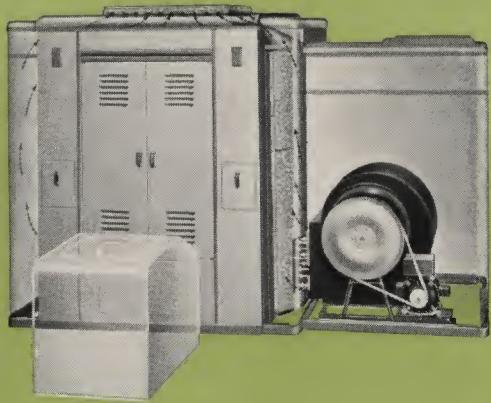
Sunbeam Stoker Fired Air Conditioner.
Any standard Hopper Feed or Bin Feed
Stoker can be connected to this Unit.

THE FOX FURNACE COMPANY, ELYRIA, OHIO

A DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION



Interior view of Sunbeam Series "S" showing the filters, blower and motor. Illustration shows a bin-feed stoker connected to the side of Unit.



Inner Casing

This Unit is equipped with a galvanized inner casing which keeps the circulating air in close contact with the heating element and prevents heat loss into the basement.

Between the inner casing and the outer cabinet is a space through which a portion of the air from the blower circulates. This "insulating" air absorbs heat that might pass through the inner casing, and enters the warm air stream through openings provided at the top of the inner casing. As a result of this ingenious design, the outer cabinet is relatively cool and radiation losses into the basement are reduced.

Series "S" Sunbeam Air Conditioning Unit, Designed for Stoker Firing Exclusively

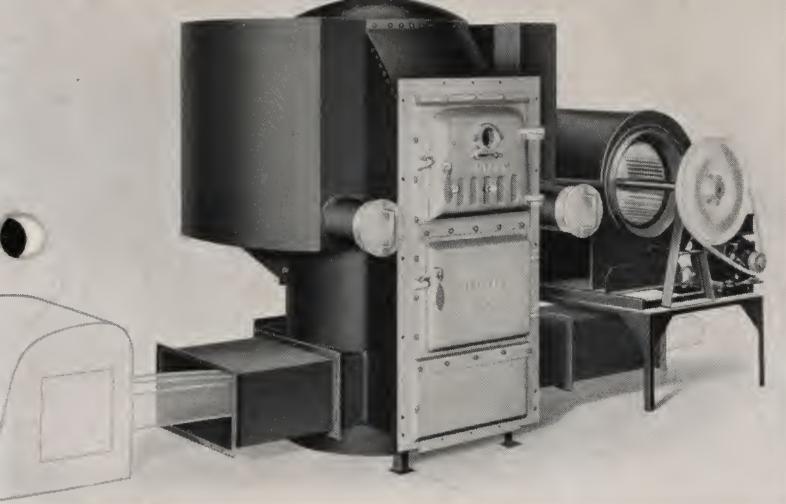
In the development of the Series "S," experienced Sunbeam engineers collaborated with recognized stoker experts to produce an air conditioner specially designed for efficient, economical and care-free operation with stoker firing. The result is a unit that offers many exclusive features that increase the desirability of coal, stoker-fired.

The Series "S" will accommodate Hopper or Bin Feed types of any standard make of stoker. The stoker can be connected to front, rear, either side, or the base of unit through openings provided in the heating element and outer cabinet at the factory.

An outstanding feature of the Series "S" is the extra large Double Radiator which, under normal conditions, requires cleaning only once or twice during the heating season. Due to the extra heating surface provided, fly ash can fill approximately one half of the radiator without reducing the rated capacity of the unit.

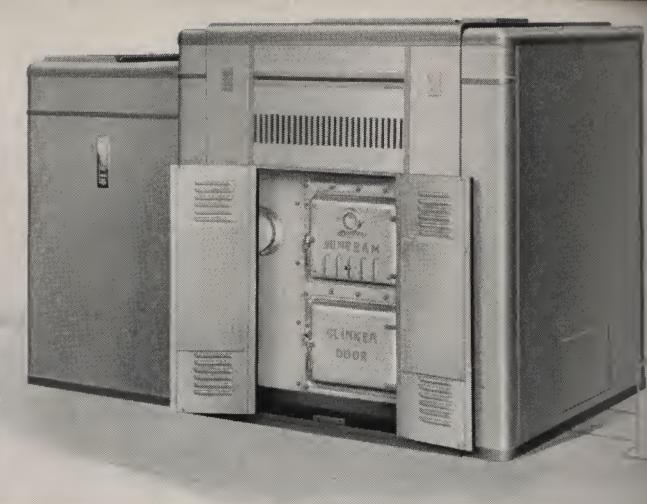
Home owners will appreciate the clinker removal feature. The clinker is conveniently accessible because of the large fire door opening and the easy access to the fire bed. As clinkers are lifted from the retort they can be dropped, through an opening in the clinker disposal frame, into the clinker pan and left until they have cooled and gases have passed up the chimney.

To the superior mechanical features of this series is added a cabinet of outstanding beauty and attractiveness. Modern in design and finished in two tones of glossy green enamel, these units are ideally fitted for the up-to-date basement recreation room.



Installation of Bin Feed Stokers . . .

As shown in the illustration above, a passage for installation of bin feed stoker from right or left side is attained by removing plates at the sides of heating element. An angle iron stand, to raise the blower high enough to permit the Chute Extension that encloses the screw tube to pass under it, is available for this type of installation.



Installation below Base of Unit . . .

The Series "S.U." can be provided, when screw tube is to be "pitted" or installed below floor level. Instead of chutes at the side and rear, the combustion chamber of this model has an opening in the base 15" in diameter to permit insertion of stoker retort. No chute extensions are required. Illustration above shows how the clinker door and fire door, also enameled cabinet doors, are lowered for this installation.

Hopper or Bin Feed Stoker can be Installed from side, front, rear or below floor level

No cutting of heating element or cabinet is required to install any standard make of stoker in the Series "S." As illustrated on page 2, the heating element is provided with openings and chutes on right and left sides and rear, and with a detachable plate in front. The exterior cabinet is provided with corresponding openings, sealed with plates enameled to match the casing. By removing necessary plates in the outer

casing and heating element, openings 8½" high by 17" wide are provided for inserting retort and screw tube. The blower compartment can be attached to either right or left side of the unit so that stoker hopper can always be located on side of the unit opposite the blower. Chute Extensions, easily attached to the chutes, and which provide an air-tight housing within the unit for stoker screw tube, are available.

Control Equipment

Temperature Control Equipment, for any degree of regulation that may be desired by any home owner, is available with Sunbeam Air Conditioning Units. Where the simplest kind of regulation is wanted or where very sensitive regulation is wanted this equipment will provide it most satisfactorily and economically. The individual instruments, which are included in the various combinations, are generally considered the finest available. The proper combination of controls for each and every temperature regulation job is listed in the Price List for Series "S" and "SU" Sunbeam Air Conditioning Units.



No. T-11-1 and No. T-21
Plain Thermostat



No. T-105-1 and No. 205-1
Night and Day
Electric Clock Thermostat



No. H-8
Humidistat



No. V-83
Solenoid Water Valve



No. R-155
Control Box



No. L-401-4 Blower,
Limit and High Cut-in Switch



No. L-412-2
Blower Switch



No. T-29-1
Night and Day Thermostat
(For Zone Control)



No. M-26-6
Duct Damper Motor
(For Zone Control)



No. A-10 and No. B-10
Power Box
(For Zone Control)



No. L-219-1
High Cut-in Relief Switch
(For Zone Control)

SUNBEAM Equipment AND Accessories SERIES "S"

The Blower

These blowers are large, powerful and silent. They operate at low speeds, consuming a minimum of current, and move a large volume of air at low velocities and at comparatively low temperatures. The blower and motor are securely mounted on an integral rigid angle iron frame which prevents vibration and its possible resulting noise. Because of this integral base, pulleys are quickly and easily aligned and remain in alignment indefinitely.

Blowers and motors have extra capacity for summer cooling operation or to overcome greater than average resistance in the ducts. Blowers are equipped with rubber mounted, self-aligning bearings. Large oil reservoirs are provided.

Motors are of the capacitor type, specially designed for air conditioning installations. They do not cause radio interference. Each motor is equipped with a special safety device which protects it against damage caused by overloading.

The blower compartment has a large access door for reaching filters, blower and motor. Illustration shows the large amount of filter surface and how the vertical row of filters extends to bottom of access door.

Air Filters

These filters combine the two desirable qualifications of high cleaning efficiency and long life. They offer comparatively little resistance to the circulating air after a period of service which finds many other types of filters completely clogged and in need of replacement. Their capacity to hold more dirt, dust, soot, lint, pollen and bacteria — and thus their longer life — is due to the "V" angle construction and to the fact that they can be treated with an unusually large amount of adhesive coating without filling up the passages through which the air must circulate. The accompanying illustration shows the advantages of the "V" angle construction. The air must "turn a corner" in the center of the filter. This turbulence causes all of the air to be wiped against the ample adhesive surfaces of the bottom section, thus removing a maximum of foreign matter. Since the openings in the bottom section are smaller, they are first to fill up. Unlike other makes of filters, the top section will not clog and lose its efficiency while the bottom section remains clean and unused. When clean filters are required, they can be obtained at the cost of ordinary filters.

Spray Humidifier and Humidity Control Instrument

This new type of spray humidifier, automatically controlled by a room humidistat, has proven its ability to properly humidify the air even in those sections where salts, lime, and "hard" water prevent the functioning of other types of humidifiers. When one nozzle does clog, it is turned off and the next one turned on, until all are clogged. All the nozzles are cleaned at one time in a few minutes. Cleaning is needed only a few times during a heating season.

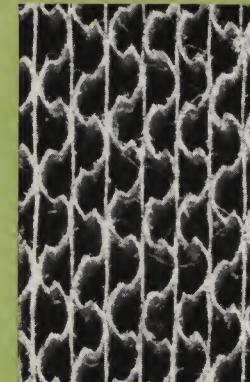
While this humidifier has the capacity to supply satisfactory relative humidity, it also possesses another desirable feature. The amount of water atomized can be adjusted to the air's ability to absorb moisture — and thus prevent condensation in plenum chamber — by changing the position of atomizing plate.

The Humidistat controls the solenoid valve in the water line and automatically controls relative humidity just as the thermostat automatically controls temperature. The solenoid valve is wired so that when Humidistat calls for moisture the solenoid valve cannot open unless blower is running. The blower cannot run unless heat is available in bonnet. Therefore, moisture is never introduced unless there is heat and air movement to absorb and carry away moisture.

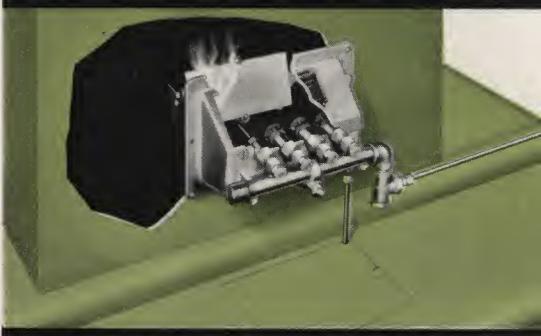
The Humidistat is adjustable and can be set to maintain any desired relative humidity.



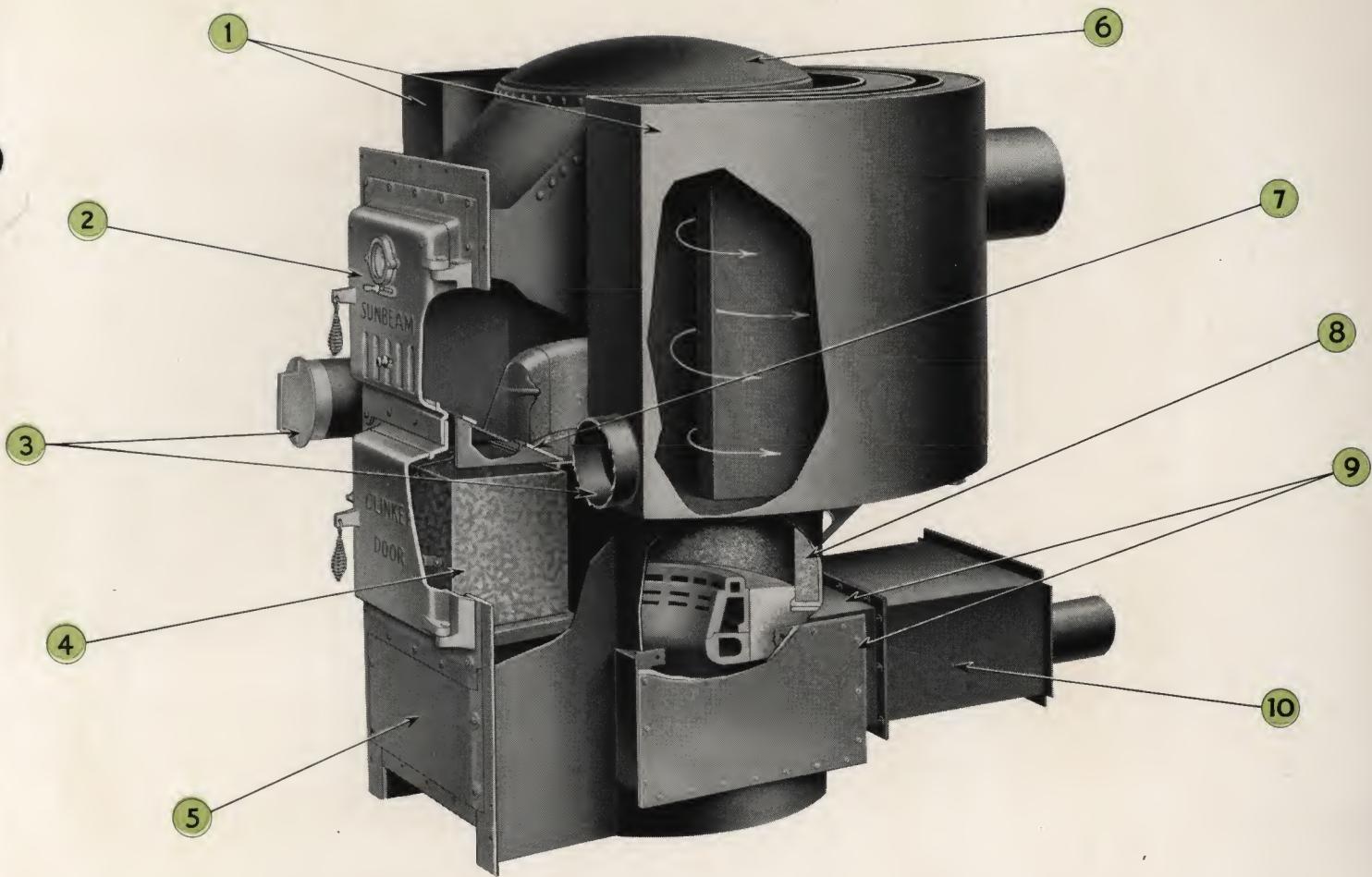
The powerful, silent Blower



Top view of section of Sunbeam Filter and side view showing the "V" angle construction



This illustration shows the spray humidifier with spray head "A" in operation; capacitive adjusting atomizing plate; strainer; copper tubing leading to water line connection; aluminum pipe leading from aluminum pan to drain. Solenoid valve, pressure reducing valve and strainer are mounted on back of outer cabinet.



Superiorities of SERIES "S" Heating Element

1 DOUBLE RADIATOR. Has two complete fire travel passages and an unusually large area of heating surface. Fly ash can accumulate to approximately half the height of radiator without reducing the rated heating capacity of the unit. Requires cleaning only once or twice a year. Has no horizontal or vertical baffles to obstruct cleaning, or on which fly ash can accumulate. Rounded construction facilitates cleaning, as there are no inaccessible corners. Made of 12 gauge steel. Seams are welded leak proof.

2 FIRE DOOR HAS 3 FEATURES. (1) Provides an opening 15"x12" assuring convenient access to clinker. (2) Fire can be observed through glass covered opening. (3) Adjustable openings admit secondary air above fire bed, which is necessary for proper combustion.

3 CLEANOUT COLLARS — Conveniently located at front of radiator, are reached through detachable plates in the exterior cabinet. Permit cleaning of both sections of radiator with brush (which is furnished), or vacuum hose.

4 CLINKER PAN. Clinkers are dropped into this receptacle through opening in clinker disposal frame. As clinker cools, odorous gases, that are given off, pass up the flue. At a convenient later time, the pan can be removed through clinker door opening and emptied.

5 DETACHABLE PLATE. When screw tube is to enter front of unit, removal of this plate provides an opening 8½" high x 17" wide.

6 DRUM. Constructed of No. 7 gauge boiler plate steel with seams riveted and welded — a combustion chamber particularly desirable for stoker firing.

7 CLINKER DISPOSAL FRAME. The inclined or slanting Clinker Disposal Frame, together with large fire door opening, makes it easy to reach every part of fire bed. An opening in center of frame allows clinker to be dropped directly into cooling pan.

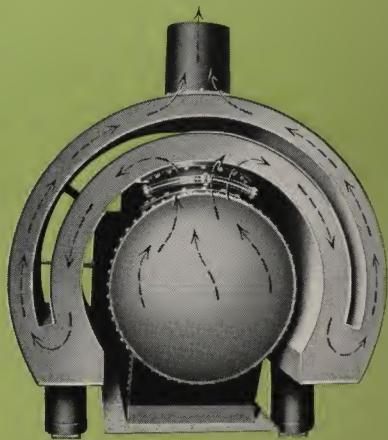
8 FIRE BRICK. Fire Brick, to protect the steel shell from flame impingement, is standard equipment.

9 OPENINGS AND CHUTES. In the Series "S," stoker can be installed from either right or left side or rear through openings provided at the factory. Steel chutes are welded to the openings and sealed gas tight with metal plates and gaskets. Corresponding openings, covered with matching enameled plates, are provided in exterior cabinet so no cutting is required of installer. The Series "S.U." (not illustrated), in which stoker is installed below floor level, has an opening in the base 15" in diameter instead of chutes at the side and rear. Fire Door and Clinker Door on the "S.U." Series are lowered as illustrated on page 3.

10 CHUTE EXTENSIONS — attach to the steel Chutes of Series "S." Provide an air tight housing, within the air conditioner, for screw tube. Made in two sizes: One to extend from chute to heating compartment casing; One to extend through blower compartment, for side-to-side bin feed stoker installations (see illustration at top of page 2).

Top View of the Heating Element

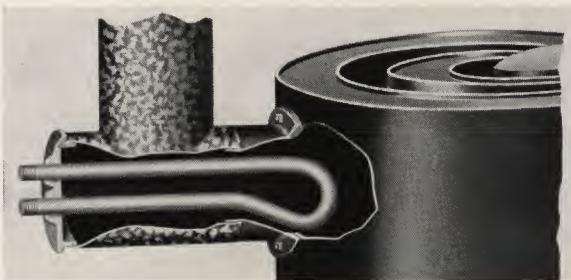
At the right is pictured the top of the drum and double radiator of the Sunbeam Series S. Arrows indicate fire travel from the drum through the two passages in the radiator. The space provided between the two passages in the radiator exposes two additional heating surfaces to the circulating air thus increasing the efficiency and capacity of this unit.



Drip Humidifier

This apparatus connects to the water line. A thermostatic element expands and contracts with the temperature in the bonnet to admit more or less water to the evaporating reservoir. Humidifier is placed directly above the heating element. The amount of water evaporated by this humidifier is determined largely by temperature in bonnet and not by humidity requirement of living quarters. Humidifier has manual adjustment to vary flow of water into reservoir.

Drip Humidifier



Auxiliary Hot Water Coil

Illustrated at the left is the auxiliary hot water coil available for installation in Series "S." This coil will furnish much, if not all, of the hot water required in a home, during the winter months when the Sunbeam is under fire. A durable corrosion-resisting metal is used in its construction. There are no joints which might leak, as the coil is formed of one continuous pipe. The auxiliary hot water coil is installed in the flue outlet, as illustrated in the picture opposite.

DIMENSIONS — CAPACITIES

Blower-Motor-Filter Specifications Series "S"

No.	*Max. Stoker Input Lbs. per Hr.	Max. B. T. U. Cap. at Register	†C.F.M. Required at 65° F.	Approx. Blower R. P. M. $\frac{1}{4}$ " S.P.	Blower Number	Dia. of Blower Wheel	Pitch Dia. of Blower Pulley	Number of Blowers	Motor H. P.	Motor R. P. M.	Number Filters
24-S	17 $\frac{1}{2}$	150,000	1610	370	1-15	15"	15"	1	$\frac{1}{2}$	1725	4(20" x 20")
27-S	23 $\frac{1}{2}$	200,000	2145	312	1-18	18"	15"	1	$\frac{3}{4}$	1725	5(16" x 25")

*Combustion rate of stoker must conform to heating requirements of installation. Ratings based on coal having a calorific value of 12,000 B.T.U. per pound.

†Air heated from 65° to 165° F. increases 19% in volume. Therefore, warm air ducts should have capacity for 19% greater C. F. M. than listed above.

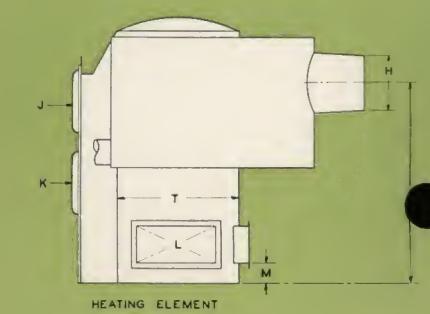
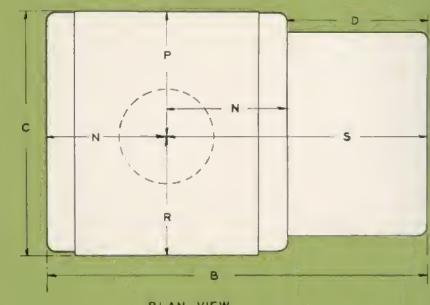
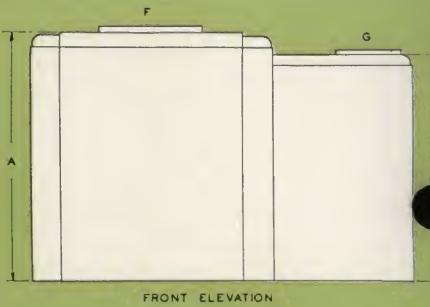
Dimensions — Series "S"

		24-S	27-S
A	Height of Heating Compartment	61 $\frac{1}{2}$ "	67"
B	Overall Width	91 $\frac{5}{16}$ "	98 $\frac{11}{16}$ "
C	Overall Depth	58 $\frac{3}{8}$ "	63 $\frac{3}{8}$ "
D	Width of Blower Compartment	48 $\frac{1}{16}$ "	54 $\frac{13}{16}$ "
E	Height of Blower Compartment	55"	56 $\frac{1}{2}$ "
F	Air Discharge Opening	26" x 26"	30" x 30"
G	Air Intake Opening	16 $\frac{1}{4}$ " x 44 $\frac{3}{16}$ "	20 $\frac{3}{8}$ " x 50 $\frac{5}{16}$ "
H	Smoke Collar Diameter	9"	9"
I	Approximate Distance From Floor To Center of Smoke Outlet	43 $\frac{1}{4}$ "	44 $\frac{1}{8}$ "
J	Size of Upper Door Opening	15" x 12"	15" x 12"
K	Size of Clinker Door Opening	15" x 12"	15" x 12"
L	Size of Screw Tube Chute Openings ("S" model only)	17" x 8 $\frac{1}{2}$ "	17" x 8 $\frac{1}{2}$ "
M	Distance From Floor To Bottom of Chute Opening	4 $\frac{1}{4}$ "	4 $\frac{1}{4}$ "
N	Distance From Center of Drum To Side of Heating Cabinet	28 $\frac{5}{8}$ "	31"
P	Distance From Center of Drum To Rear of Heating Cabinet	29 $\frac{3}{16}$ "	31 $\frac{3}{4}$ "
R	Distance From Center of Drum To Front of Heating Cabinet	29 $\frac{1}{16}$ "	31 $\frac{1}{16}$ "
S	Distance From Center of Drum To Far Side of Blower Compartment	62 $\frac{1}{16}$ "	67 $\frac{1}{16}$ "
T	*Inside Diameter of Combustion Chamber	24"	27"
	Door Opening Required to Admit Drum	28"	33"
	Diameter of Opening in Base of Combustion Chamber (S. U. Model)	15"	15"

*Determine clearance for stoker retort by deducting 3 $\frac{1}{2}$ " (required for fire brick) from inside diameter of combustion chamber.

Series "SU"

Series "S.U." is designed for Bin-Feed stokers with the screw tube located BELOW the base of the air conditioner. With the Series "S.U.", an opening 15" in diameter in the base of the combustion chamber is provided for the insertion of the retort. The steel chutes of the Series "S" are omitted in the Series "S.U."



THE SUNBEAM OIL BURNING
Air Conditioning Unit



SERIES No. 100,
No. 200, No. 400
AND No. 600

In the Sunbeam Oil Burning Air Conditioning Unit, a pioneer organization in the heating, ventilating and air conditioning industry combines with efficiency of the highest order, beauty and attractiveness that heretofore have never been attained!

In the artistic lines, graceful proportions and inviting colors of this Air Conditioner, attractiveness of appearance has finally reached the

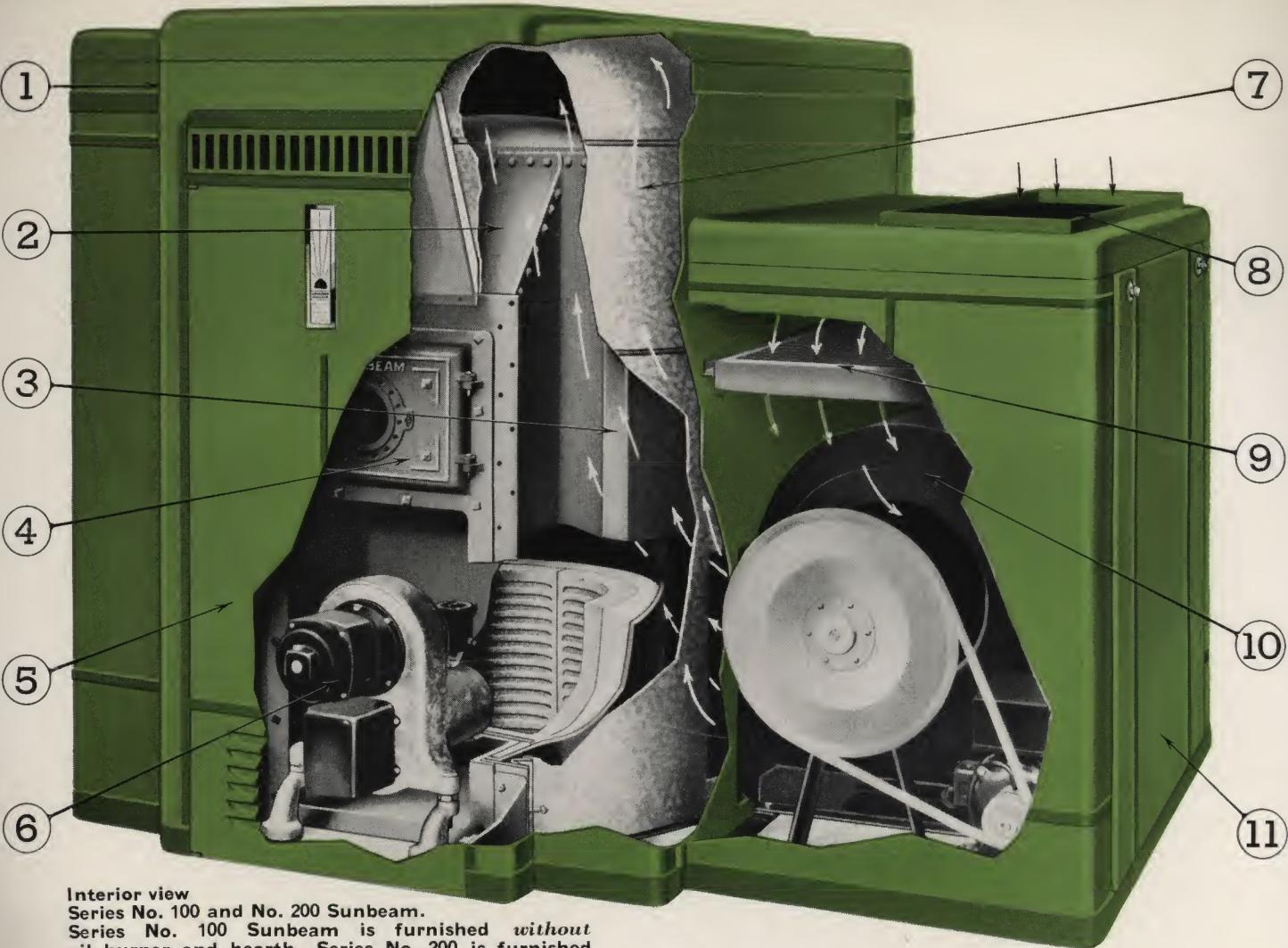
same high standard of excellence that has always been a characteristic of the mechanical design and construction of equipment sponsored by this company.

NOW AVAILABLE IN TWO SIZES
This modern Air Conditioner is now available in two sizes—with 24" and 34" diameter combustion chambers. Capacities now range from 100,000 to 331,000 Btu delivery at the registers.

THE FOX
FURNACE CO.
ELYRIA, OHIO

SUNBEAM
AIR CONDITIONING UNIT

A DIVISION OF
AMERICAN RADIATOR
& STANDARD SANITARY
CORPORATION



Interior view

Series No. 100 and No. 200 Sunbeam.

Series No. 100 Sunbeam is furnished *without* oil burner and hearth. Series No. 200 is furnished *with* oil burner and hearth as standard equipment.

Beauty COMBINED WITH Efficient Design

1 EXTERIOR CABINET—glossy, smooth green enamel baked on rigid, 20 gauge cold rolled furniture stock. *Rounded Corners*, graceful proportions, the absence of bolts and screws, and contrasting trim of dark green, provide this Air Conditioner with an attractiveness of appearance that is unexcelled.

2 HEATING ELEMENT—Constructed of No. 7 gauge boiler plate, riveted and welded to produce a gas tight unit. Scientific design and large amount of heating surface provide high efficiency and capacity.

3 RADIATOR SECTION OF HEATING ELEMENT, constructed of No. 12 gauge steel, where the heat from the products of combustion are thoroughly utilized before passing into flue.

4 ACCESS DOOR to heating element with glass covered observation opening for observing combustion.

5 LARGE DOOR which conceals, and also gives easy access to, heating element and oil burner.

6 POSITION OF OIL BURNER. In Series No. 100 and No. 200, gun type oil burner connects to front of heating element.

7 INNER CASING of galvanized iron. Part of the air from the blower circulates between the inner and outer casings to keep the exterior of cabinet cool. This air joins the air which is heated by contact with the heating element, through the round openings at the top of the casing. The inner casing brings the bulk of the circulating air into intimate contact with the heating element.

8 RETURN AIR INTAKE OPENING—Return air duct system terminates at this inlet.

9 AIR FILTERS—Foreign matter—dirt, dust, lint, germs, pollen—is removed by the filters as the air passes through them.

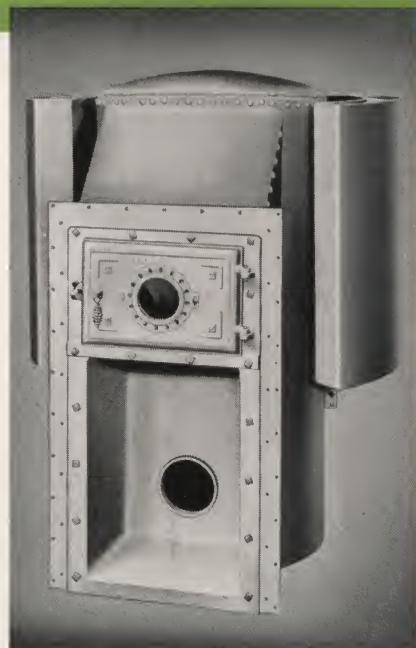
10 THE BLOWER—High in efficiency and air moving capacity. Large, powerful and quiet. Is equipped with rubber mounted, self-aligning bearings, which require oiling only a few times a year.

11 LARGE TIGHT-FITTING PANEL which gives easy access to filters, blower and motor.

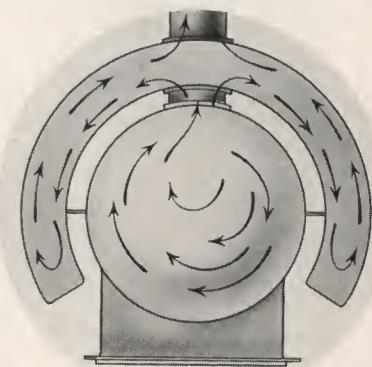
The Boiler Plate Heating Element

Series No. 100 and No. 200

HIGHLY EFFICIENT, LONG-LIVED AND LEAK PROOF



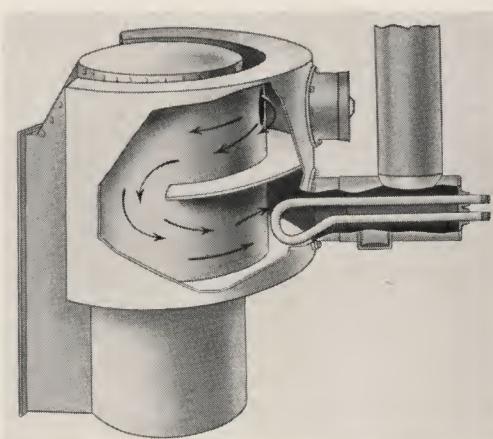
Front View of the Sunbeam Heating Element, Series No. 100 and No. 200



Top view of heating element with arrows indicating fire travel.

AUXILIARY HOT WATER COIL

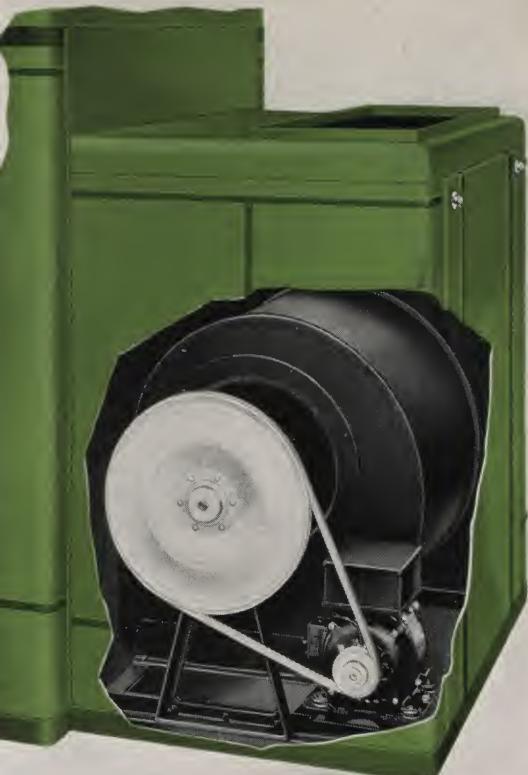
Illustrated at the right is the auxiliary hot water coil available for installation in Series Nos. 100, 200, 400 and 600. This coil will furnish much, if not all, of the hot water required in a home, during the winter months when the Sunbeam is under fire. A durable corrosion-resisting metal is used in its construction. There are no joints which might leak, as the coil is formed of one continuous pipe. In installing the auxiliary coil, a special plate replaces the cleanout cover in the smoke tee and the coil is installed as illustrated.



Side view of heating element indicating fire travel and illustrating position of auxiliary hot water coil.

SUNBEAM Equipment and Accessories

Series No. 100, No. 200, No. 400 and No. 600



The powerful, silent Blower



Top view of section of Sunbeam Filter and a side view showing the "V" angle construction.

SPRAY HUMIDIFIER AND HUMIDITY CONTROL INSTRUMENT

This new type of spray humidifier, automatically controlled by a room humidistat, has proven its ability to properly humidify the air even in those sections where salts, lime, and "hard" water prevent the functioning of other types of humidifiers. When one nozzle does clog, it is turned off and the next one turned on until all nozzles are clogged. All four nozzles are cleaned at one time—a simple operation requiring only a few minutes. Cleaning is necessary only a few times during a heating season.

While this humidifier has the capacity to supply satisfactory relative humidity during the heating season, it also possesses another desirable feature. The amount of water atomized can be adjusted to the air's ability to absorb moisture—and thus prevent condensation in the plenum chamber—by changing the position of the atomizing plate.

The Humidistat controls the solenoid valve in the water line and automatically controls relative humidity just as the thermostat automatically controls temperature. The solenoid valve is wired so that when Humidistat calls for moisture the solenoid valve cannot open unless blower is running. The blower cannot run unless heat is available in bonnet. Therefore, moisture is never introduced unless there is heat and air movement to absorb and carry away moisture . . . The Humidistat is adjustable and can be set to maintain any desired relative humidity.



CONTROL EQUIPMENT

Temperature control equipment for any desired degree of regulation, is available with the Sunbeam Air Conditioning Unit. Control Combinations are provided which give control of temperature from one central point, or give localized control for each section or room in a home. The individual instruments, which are included in these control combinations, are generally considered the finest available.

THE BLOWER

These Blowers are large, powerful and silent. They operate at low speeds consuming a minimum of current, and move a large volume of air at low velocities and at comparatively low temperatures.

The blower and motor are securely mounted on an integral, rigid angle iron frame which prevents vibration and its possible resulting noise. Because of this integral base, pulleys are quickly and easily aligned and remain in alignment indefinitely.

Blowers have extra capacity for summer cooling operation or to overcome greater than average resistance in the ducts. Blowers are equipped with rubber mounted, self-aligning bearings. Large oil reservoirs are provided.

Motors are of the capacitor type, specially designed for air conditioning installations. They do not cause radio interference. Each motor is equipped with a special safety device which protects it against damage which could be caused by overloading.

AIR FILTERS

These filters combine the two desirable qualifications of high cleaning efficiency and long life. They offer comparatively little resistance to the circulating air after a period of service which finds many other types of filters completely clogged and in need of replacement. Their capacity to hold more dirt, dust, soot, lint, pollen and bacteria—and thus their longer life—is due to the "V" angle construction and to the fact that they can be treated with an unusually large amount of adhesive coating without filling up the passages through which the air must circulate. The accompanying illustration shows the advantages of the "V" angle construction. The air must "turn a corner" in the center of the filter. This turbulence causes all of the air to be wiped against the ample adhesive surfaces of the bottom section, thus removing a maximum of foreign matter. Since the openings in the bottom section are smaller, they are first to fill up. Unlike other makes of filters, the top section will not clog while the bottom section remains clean and unused. When clean filters are finally required, they can be obtained at the same low cost of ordinary filters.



This illustration shows the spray humidifier with spray head "A" in operation; capacitive adjusting atomizing plate; strainer; copper tubing leading to water line connection; and pipe leading from aluminum pan to drain. Solenoid valve, pressure reducing valve and strainer are mounted on back of outer cabinet.

THE SERIES No. 400 AND No. 600 **SUNBEAM**

Oil Burning Air Conditioning Unit

WITH 34" DIAMETER COMBUSTION CHAMBER. GUN TYPE OIL BURNER CONNECTS TO REAR OF HEATING ELEMENT

No. 434 Unit Furnished WITHOUT Oil Burner

**No. 634 Unit Furnished WITH Integral,
Coordinated Oil Burner**

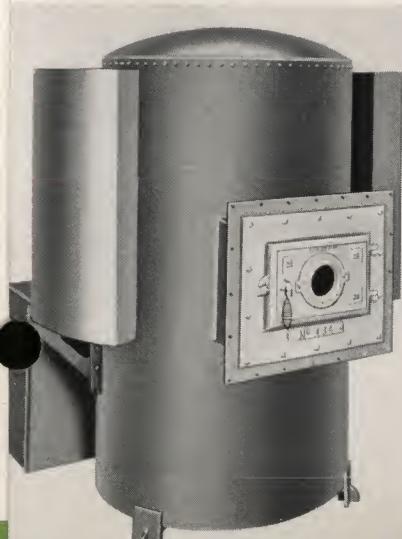
The Series No. 400 and No. 600, with the exception that the oil burner is attached to the *rear* of the heating element, is virtually the same as the Series No. 100 and 200 Sunbeam.

With the addition of the No. 434 and No. 634 size (34" diameter combustion chamber) this outstanding line of air conditioners now ranges in capacity from 100,000 to 331,000 Btu delivery at the registers. The largest homes, as well as those of average size, can now be air conditioned with these superior oil fired units.

The No. 634 is available with an integral, coordinated, gun type oil burner specially designed for operation with this air conditioner. However, it is also furnished without the oil burner (No. 434). Standard gun type burners of the proper capacity can be connected to it. The oil burner is connected to the rear of the heating element and is located directly below the flue outlet. Accordingly, it is out of sight and is accommodated in space that could be utilized for no other purpose.

Like all Sunbeam Units, the No. 434 and No. 634 are remarkably high in efficiency. Simplicity of design which assures trouble-free operation, and economical fuel consumption, are noteworthy features. The exterior cabinet with its attractive proportions and two-tone glossy green enamel finish can be readily and economically assembled. All joints fit together easily and tightly.

View of No. 434
and No. 634
heating element.



Front of Series No. 434 and No. 634 (34" combustion chamber)



Rear view of No. 434 and No. 634 showing location of gun type oil burner. Blower-Compartment Door is Removed. The No. 634 is furnished with integral, coordinated gun type oil burner. The No. 434 is furnished without oil burner. Any standard make of gun type burner can be connected to it.

THE HEATING ELEMENT

Heavy, durable, and gas-tight construction are features of the No. 434 and No. 634 heating element. Walls of combustion chamber are made of No. 7 gauge boiler plate; combustion chamber head of No. 6 gauge; radiator of No. 12 gauge plate. Joints are riveted and welded. Ample heating surface, without resorting to small, restricted gas passages, and unusually long fire travel insure that the heat generated at the burner is fully utilized—and that the Sunbeam standard of high efficiency is maintained.

The compartment in the rear of the heating element provided for the oil burner measures 41" long, 23 $\frac{7}{8}$ " high and 12 $\frac{1}{2}$ " deep. A cast iron collar 6 $\frac{1}{2}$ " wide and 9 $\frac{1}{2}$ " high connects burner compartment to combustion chamber.

THE SERIES No. 400 **SUNBEAM**

Oil Burning Air Conditioning Unit



View of front of No. 424 with access door in open position.



Rear View of No. 424 showing location of Oil Burner.
No. 424 is not furnished with oil burner and hearth.

THE No. 424 (24" DIAMETER COMBUSTION CHAMBER). GUN TYPE OIL BURNER CONNECTS TO REAR OF HEATING ELEMENT

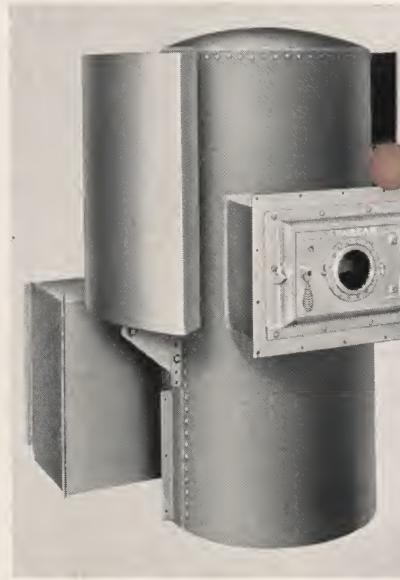
Oil Burner and Hearth are NOT Furnished with the No. 424.

The No. 424 Sunbeam is designed for homes having heating requirements of 100,000 to 186,000 Btu. In appearance, capacities, finish and dimensions the No. 424 is identical with the No. 124 and No. 224. Oil burner connects to rear of heating element through a circular opening 7" in diameter. The space provided for oil burner measures 40" wide by 22 $\frac{1}{8}$ " high. Because of its location under the smoke pipe, the burner does not occupy usable space.

Virtually any Gun Type Oil Burner can be installed.

THE HEATING ELEMENT OF THE No. 424

In the No. 424, the cast iron pouch at the front of heating element in Nos. 124 and 224 Units, is eliminated. The compartment for housing the oil burner is connected to rear of heating element. Combustion Chamber is constructed throughout of No. 7 gauge steel, riveted and welded. Radiator is constructed of No. 12 gauge metal.



View of No. 424 Heating Element.

Capacities—Blower, Motor, Filter Specifications—Series No. 100, No. 200, No. 400 and No. 600

No.	Oil Burner Input (Gal.) per hr.	Maximum B.T.U. Cap. at Reg.	*Max. C.F.M. Required at 65° F.	*Approx. Blower R.P.M. at $\frac{1}{4}$ " S.P.	Dia. of Blower Wheel	No. of Blowers	Motor H.P.	Motor R.P.M.	Number Filters
124, 224 and 424	1.2	123,000	1218	482	12"	1	$\frac{1}{4}$	1725	3(16"x25")
124, 224 and 424	1.5	155,000	1522	350	15"	1	$\frac{1}{3}$	1725	3(16"x25")
124, 224 and 424	1.7	176,000	1725	375	15"	1	$\frac{1}{2}$	1725	3(16"x25")
124, 224 and 424	1.8	186,000	1827	380	15"	1	$\frac{3}{4}$	1725	3(16"x25")
434 and 634	2.5	240,000	2550	311	18"	1	$\frac{1}{2}$	1725	6(16"x25")
434 and 634	3.0	285,000	3050	314	18"	1	$\frac{3}{4}$	1725	6(16"x25")
434 and 634	3.5	331,000	3500	266	21"	1	$\frac{3}{4}$	1725	6(16"x25")

*Air heated from 65° to 165° increases 19% in volume. Therefore warm air ducts should have capacity for 19% greater C.F.M. than listed above.

Combustion rate of oil burner must conform to the heating requirements of the installation. Ratings are based on oil having a calorific value of 140,000 B.T.U. per gallon. Minimum input of burner must not be less than one gallon per hour.

Dimensions—Series No. 100, No. 200, No. 400 and No. 600

No.	*Overall Width	†Overall Depth	Height Heating Compartment	Height Blower Compartment	Air Discharge Opening	Air Intake Opening	Approx. Dis. From Floor to Center of Flue Outlet	Flue Vent Size Dia. Inches
124 and 224	76 $\frac{1}{4}$ "	57 $\frac{7}{8}$ "	58 $\frac{1}{8}$ "	43 $\frac{3}{4}$ "	24"x26"	13"x42"	41 $\frac{9}{16}$ "	9"
424	76 $\frac{1}{4}$ "	57 $\frac{7}{8}$ "	58 $\frac{1}{8}$ "	43 $\frac{3}{4}$ "	24"x26"	13"x42"	44 $\frac{13}{16}$ "	9"
434 and 634	99 $\frac{1}{16}$ "	64 $\frac{1}{16}$ "	67"	51 $\frac{1}{4}$ "	30"x30"	16"x45 $\frac{1}{2}$ "	49 $\frac{5}{16}$ "	10"

*Allow 2 Feet at side of blower compartment for removal and replacement of filters. †Allow 2 Feet in front for opening of doors. On No. 124 and No. 224 allow 2 Feet in rear for flue outlet. On No. 424, No. 434 and No. 634 allow sufficient space in rear for installation of oil burner.



Series No. 720-R Sunbeam.
A low priced oil burning
unit complete with integral
rotary, wall flame oil burner.

SUNBEAM

OIL BURNING AIR CONDITIONING UNIT

Equipped with

ROTARY WALL FLAME TYPE BURNER

THE FOX FURNACE COMPANY • ELYRIA, OHIO
A DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION



Interior view of Series No. 720-R showing blower, motor and filters. The oil burning door with glass covered observation opening, and grille type burner door are standard equipment.

SERIES NO. 720-R OFFERS AIR CONDITIONING AT LOW FIRST COST and LOW OPERATING COST

The Series No. 720-R makes available to home owners, at a new low price, automatic oil heating and the benefits of Air Conditioning — warm, filtered, humidified, circulating air in winter, and cooling ventilation in summer.

This Unit is a complete Air Conditioner equipped with attractive exterior cabinet, heavy gauge steel heating element, fuel economizing inner casing, integral, coordinated rotary wall flame oil burner, blower, motor and filters.

The efficient oil burner, with all its parts — motor, electric pilots, ignition transformer, dual oil valves and hearth — is completely mounted in a cast iron frame at the factory and shipped as a unit, ready to be inserted in the air conditioner. Thus installation expense is practically eliminated and a perfect burner installation is assured.

Because this Unit is compact in size, and uniformly distributes the conditioned air under pressure, it is ideal for those homes, stores and other buildings where space is at a premium. It can be placed in a convenient corner of the basement, or in a utility room above the basement.

NEWLY DESIGNED EXTERIOR CABINET

The rounded corners, graceful proportions and green crystalline enamel finish of the cabinet give the Series No. 720-R a handsome, pleasing appearance. Bolts and screws have been eliminated or concealed.

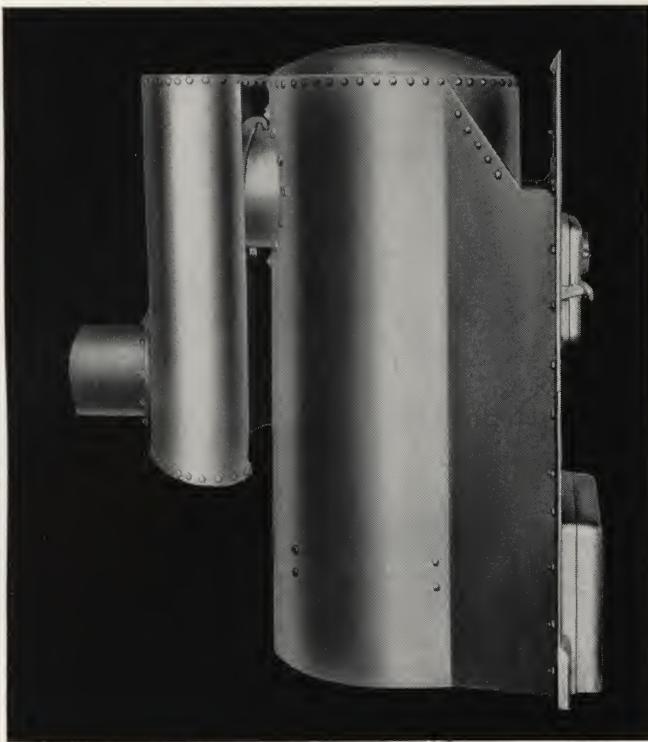
Assembly is simplified, assembly costs are reduced, and heat loss into the basement reduced because all parts of the casing are die formed, and joined by snug, slip-joints. Tight fitting, leakproof seams are assured.

Cabinets are constructed of No. 20 gauge steel. This heavy metal in combination with the bracing action of the interlocking slip-joints make Sunbeam cabinets remarkably rigid and firm.

The blower compartment is a complete unit in itself, which can be quickly and inexpensively assembled, and attached to either side of the heating compartment. If, for some special installation, a larger blower is required than the 9" blower with which this unit is equipped, it can be substituted without bothersome alterations to cabinet.



This picture illustrates the snug fitting, overlapping slip joint connections of the Series 720-R cabinet. Such air tight seams virtually prevent any air leaks through the cabinet.

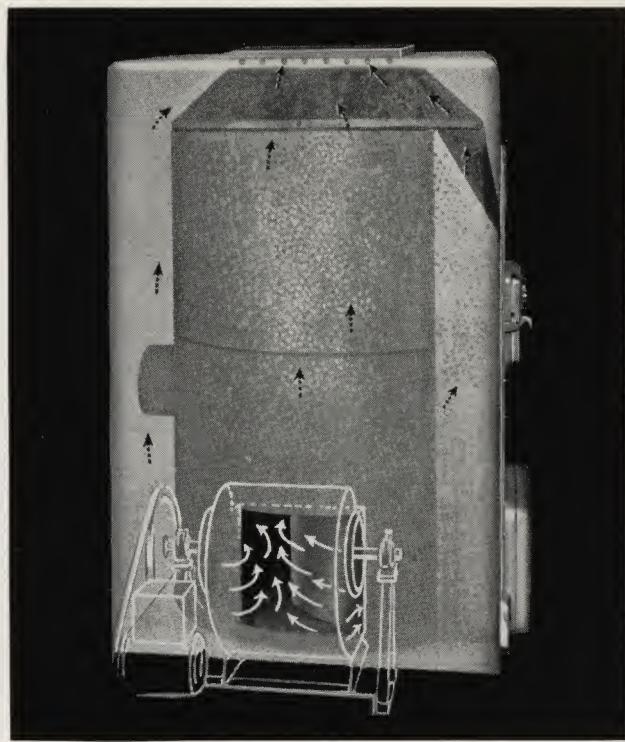


The heating element. Efficient, long lived and leakproof.

THE BOILER PLATE HEATING ELEMENT

- This heating element has been designed for the efficient and economical burning of oil. The drum is constructed of No. 8 gauge boiler plate steel; the radiator of No. 12 gauge steel plate. Joints are both riveted and welded — double protection against leakage of fumes and soot. The Sunbeam is a permanently leakproof unit — virtually seamless.

HEATING ELEMENT AND BURNER ARE PERFECTLY COORDINATED — The Sunbeam heating element and rotary wall flame oil burner have been designed as an integral unit. They are perfectly coordinated to provide high efficiency, fuel economy and long life.



This view shows the inner casing. Black arrows indicate cool, "insulating" air which circulates between inner casing and outer cabinet.

INNER CASING CONSTRUCTION

- This Unit is equipped with a galvanized inner casing which keeps the circulating air in close contact with the heating element and prevents heat loss into the basement.

Between the inner casing and the outer cabinet is a space through which a portion of the air from the blower circulates. This "insulating" air, absorbs any heat that might escape the inner casing, and enters the warm air stream through openings provided at the top of the inner casing. As a result of this ingenious design, the outer cabinet is relatively cool and fuel costs are appreciably reduced.

OIL BURNER ASSEMBLY SAVES INSTALLATION TIME, EFFORT AND REDUCES COST TO MINIMUM

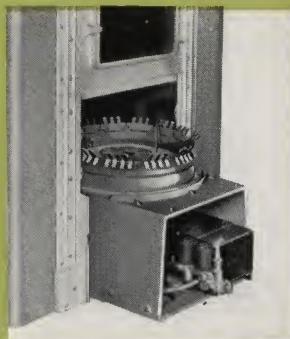
- The rotary wall flame type oil burner, motor, ignition transformer, dual oil valve, dual electric pilots, wiring box and hearth are completely mounted, at the factory, into a cast-iron frame. When making an installation, this frame containing the complete oil burner assembly is inserted into the steel heating element. Insulation, which is provided, is packed be-

tween frame and heating element. Oil line and electrical connections are made. Oil leveling valve, oil input and air mixture are set. There is nothing more to do. Time, labor and money are saved by this ingenious assembly.

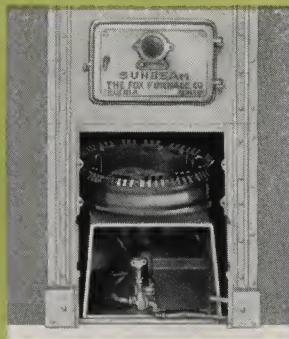
A hearth construction of unique design assures unusually dependable burner operation.



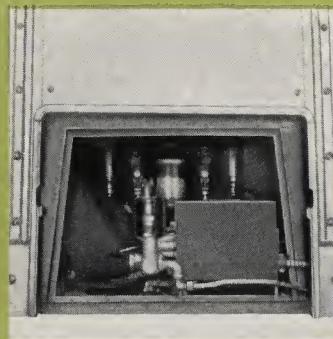
Oil Burner assembly, complete in cast iron frame as shipped from the factory, ready for installation.



Integral frame makes insertion of burner assembly a simple task as it is handled as one complete unit.



Assembly installed. Insulation to pack space between frame and the heating element is provided.



When oil line and electrical connections are made, oil valve, input and air mixture adjusted — installation is complete.



Blower and motor mounted on integral base. Saves time in aligning pulleys. Large access door is provided for reaching filters, blower and motor. This illustration shows the large amount of Filter surface in Sunbeam Air Conditioners.

a 12" blower instead of the 9" blower with which the compartment can be substituted. No special heating compartment casings or panels are required for this change.

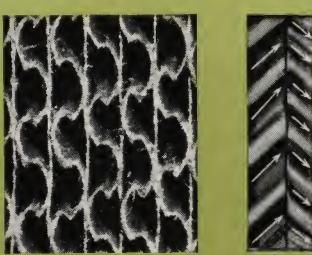
THE BLOWER

• These blowers are efficient, powerful and silent. They are the double width, double inlet type, equipped with a large number of die-formed, forward curved blades. They operate at low speeds, consuming a minimum of current, and move a large volume of air at low velocities and at comparatively low temperatures. The blower and motor are securely mounted on an integral, rigid, angle iron frame which prevents vibration and its possible resulting noise. Because of this integral base, pulleys are quickly and easily aligned and remain in alignment indefinitely.

Blowers are equipped with rubber mounted, self-aligning bearings. Large oil reservoirs are provided, which hold several months' supply of lubrication.

Motors are of the capacitor type, specially designed for air conditioning installations. They do not cause radio interference. Each motor is equipped with a special safety device which protects it against damage which might be caused by overloading.

The blower compartment is designed as a complete unit in itself. It can be assembled speedily and inexpensively, and is easily and quickly bolted to the heating compartment. If, for some out-of-the-ordinary installation, a larger blower should be required—for example, this unit is regularly equipped—the standard 12" blower and blower



Top view of section of Sunbeam Filter and a side view showing the "V" angle construction.

• These filters combine the two desirable qualifications of high cleaning efficiency and long life. They offer comparatively little resistance to the circulating air after a period of service which finds many other types of filters completely clogged and in need of replacement. Their capacity to hold more dirt, dust, soot, lint, pollen and bacteria—and thus their longer life—is due to the "V" angle construction and to the fact that they can be treated with an unusually large amount of adhesive coating without filling up the passages through which the air must circulate. The accompanying illustration shows the advantages of the "V" angle construction. The air must "turn a corner" in the center of the filter. This turbulence causes all of the air to be wiped against the ample adhesive surfaces of the bottom section, thus removing a maximum of foreign matter. Since the openings in the bottom section are smaller, they are

first to fill up. Unlike other makes of filters, the top section will not clog and lose its efficiency while the bottom section remains clean and unused. When clean filters are required, they can be obtained at the cost of ordinary filters.

AIR FILTERS



AUXILIARY HOT WATER COIL

• Illustrated at the right is the auxiliary hot water coil available for installation in Series No. 720-R. This coil will furnish much, if not all, of the hot water required in a home, during the winter months when the Sunbeam is under fire. A durable corrosion-resisting metal is used in its construction. There are no joints which might leak, as the coil is formed of one continuous pipe. In installing the auxiliary coil in the Series No. 720-R, a special plate replaces the cleanout cover in the smoke tee and the coil is installed as illustrated.

SERIES NO. 720-R — CAPACITIES — BLOWER - MOTOR - FILTER SPECIFICATIONS

No.	*Oil Burner Input (Gal.) Per Hr.	*B. T. U. Cap. at Reg.	*Max. C. F. M. Required at 65° F.	*Approx. Blower R.P.M. at $\frac{1}{6}$ " S. P.	Blower No.	Dia. of Blower Wheel	Pitch Dia. of Blower Pulley	No. of Blowers	Motor H.P.	Motor R.P.M.	Number Filters
720-R	1	100,000	986	655	1-9	9 $\frac{1}{4}$ "	12"	1	$\frac{1}{4}$	1725	2(16"x25")
720-R	.9	90,000	877	620	1-9	9 $\frac{1}{4}$ "	12"	1	$\frac{1}{4}$	1725	2(16"x25")
720-R	.8	80,000	789	590	1-9	9 $\frac{1}{4}$ "	12"	1	$\frac{1}{4}$	1725	2(16"x25")

* Air heated from 65° to 165° increases 19% in volume. Therefore warm air ducts should have capacity for 19% greater C. F. M. than listed above.

+ Combustion rate of oil burner must conform to the heating requirements of the installation. Minimum input of burner must not be less than .8 gallon per hour.

SERIES NO. 720-R — DIMENSIONS

No.	*Overall Width	†Overall Depth	Height Heating Compartment	Height Blower Compartment	Width Blower Compartment	Air Discharge Opening	Air Intake Opening	Diameter Flue Outlet	Approx. Dist. from Floor to Center of Smoke Collar
720-R	*64 $\frac{7}{8}$ "	▲38"	60"	28 $\frac{1}{4}$ "	26 $\frac{7}{8}$ "	18" x 18"	10" x 28 $\frac{1}{2}$ "	8"	23 $\frac{7}{8}$ "

* Allow clearance at side equal to width of blower compartment for removal of filters, blower and motor.

† Allow 24 inches in front for access to burner. *Allow 17 inches in rear for smoke outlet.

SERIES D

Beautiful appearance has been combined with mechanical excellence in the Series D Sunbeam Gas Fired Air Conditioning Unit. Heating elements are constructed of cast iron. Cabinets are made of 20 gauge, cold rolled, furniture steel finished in two-tone glossy green enamel. Corners are gracefully rounded. All bolts and screws are concealed. Valves, pipes and wiring are located inside of the cabinet, out of sight, yet are readily accessible.



The Series D Sunbeam is made in 4 sizes with inputs ranging from 140,000 — the No. D-2 shown above — to 350,000 Btu per hour.

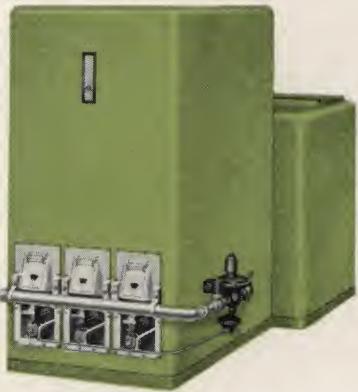
SUNBEAM

Gas Fired

AIR CONDITIONING UNIT

SERIES M

The Series M Sunbeam Air Conditioning Unit is distinctively modern and highly efficient. Outstanding among its many features is its steel heating element which has been developed by ingenious, experienced designers. The Cabinet, mechanically improved and handsome in appearance, is finished in green crystalline enamel. This compact unit will fit into a small amount of floor space.

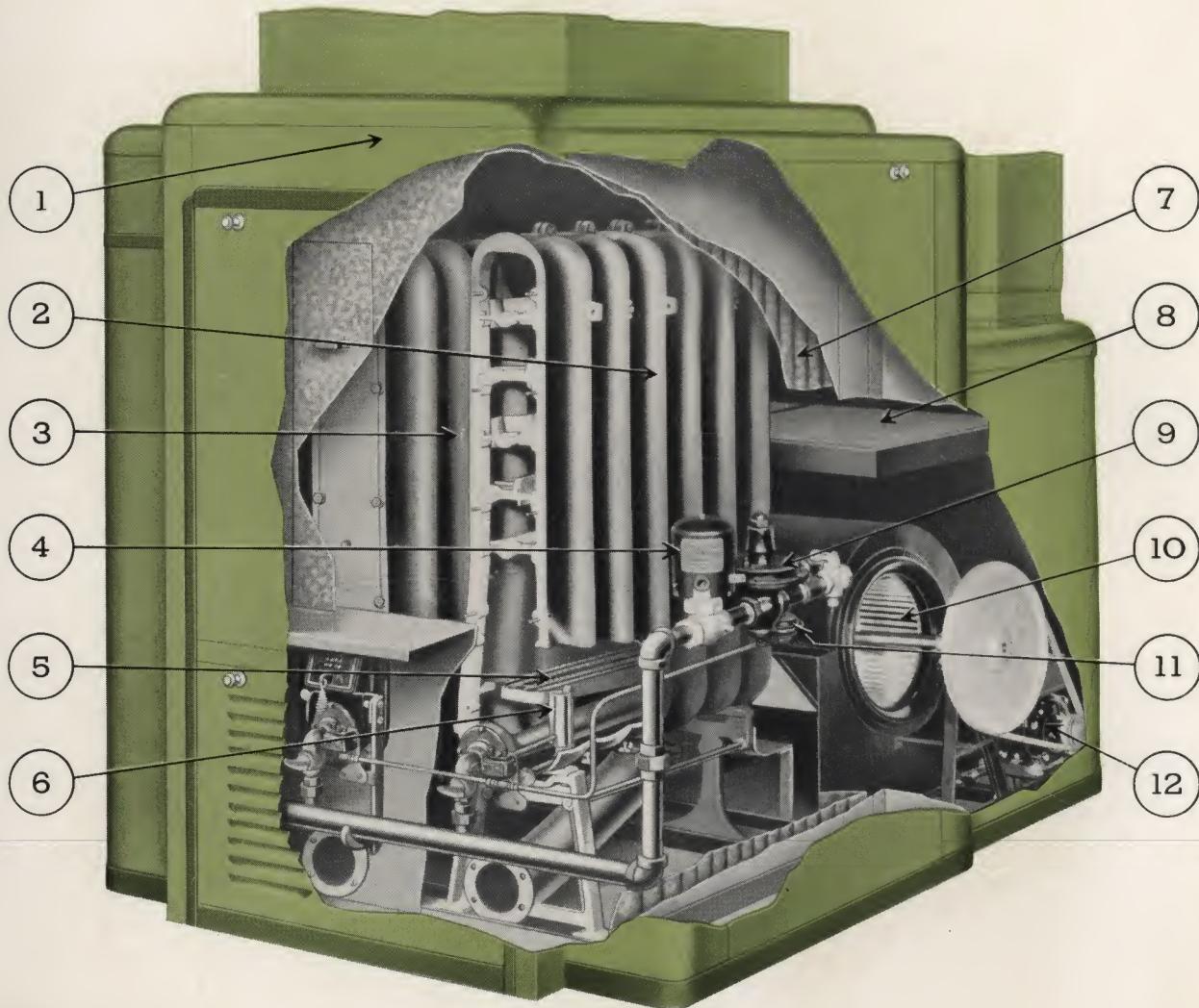


The range of input for the 4 sizes of the Series M Sunbeam is from 80,000 to 200,000 Btu per hour. The No. M-3 is illustrated above.



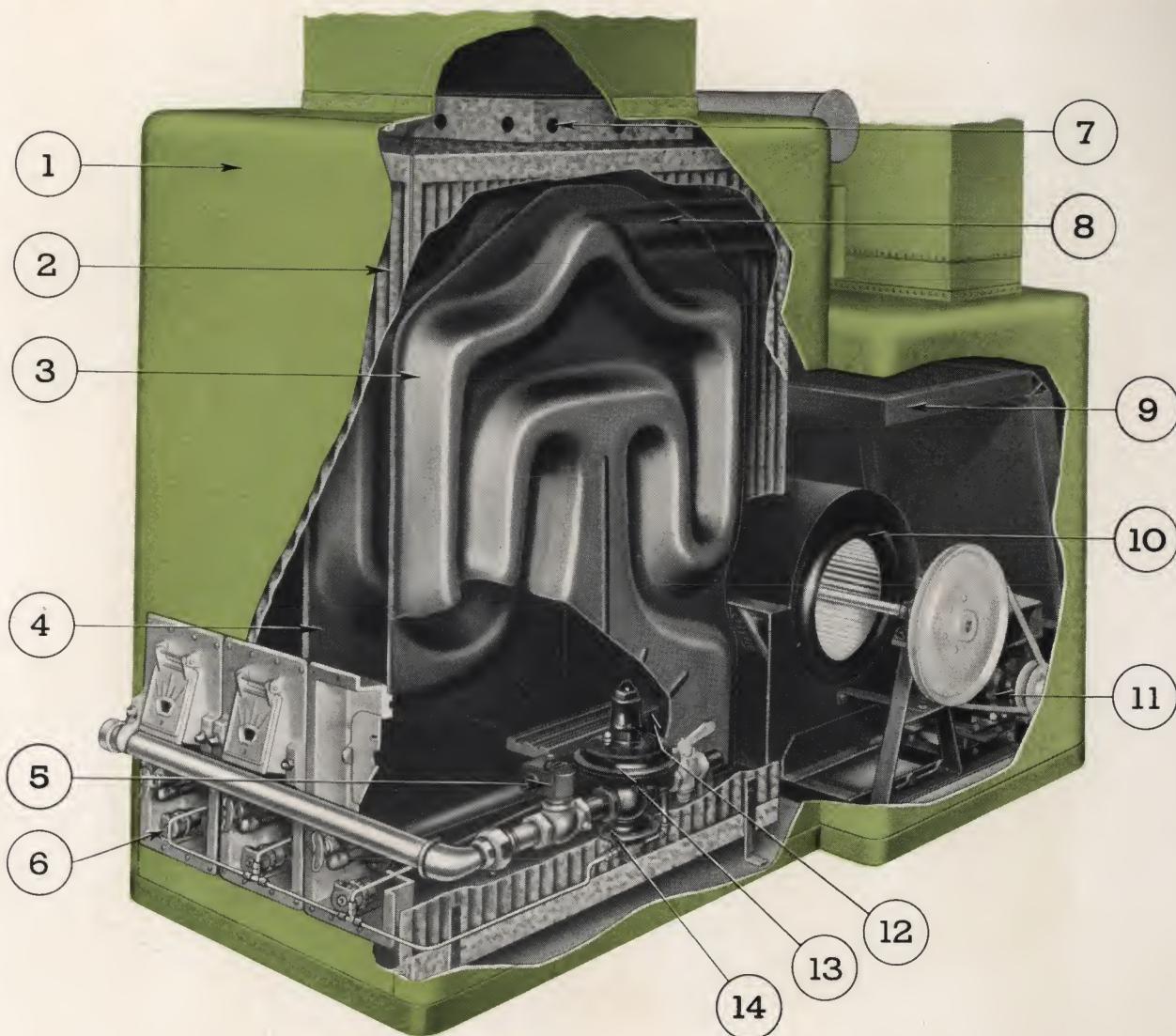
THE FOX FURNACE COMPANY • ELYRIA, O.

A DIVISION OF AMERICAN RADIATOR & STANDARD SANITARY CORPORATION



SUNBEAM SERIES D CONSTRUCTION FEATURES

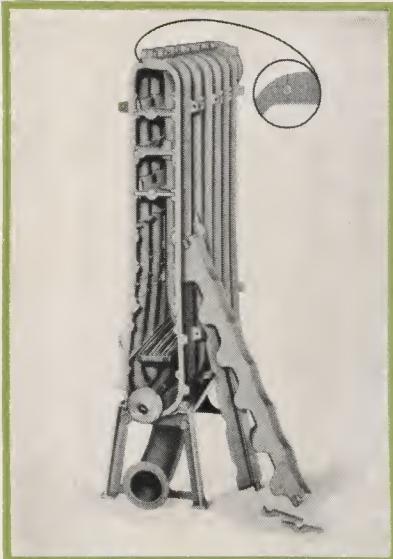
- 1 EXTERIOR CABINET** — 20 gauge, cold rolled, furniture steel finished in glossy, smooth, green enamel. The handsome appearance of this unit makes it an attractive addition to the home.
- 2 CAST IRON HEATING ELEMENT** — Each heating element is made in two sections, the faces of which are surface ground and specially packed to form a leak-proof joint. No cement or putty is used in the assembly.
- 3 AIR CIRCULATING SPACE** — Scientific proportioning of heating elements and casing areas assures that air is distributed evenly over all heating surfaces; free unrestricted flow of air through the Unit is obtained.
- 4 GAS VALVE** — Automatically turns burner on and off. Controlled by room thermostat.
- 5 BURNER** — Insures efficient, uniform distribution of natural, manufactured or mixed gas; is quiet in operation.
- 6 THERMOSTATIC PILOT** — Closes Gas Valve if pilot light becomes extinguished.
- 7 INNER CASING** — Made of corrugated galvanized iron. Prevents heat from escaping into basement; brings circulating air into intimate contact with heating surfaces.
- 8 AIR FILTERS** — Hold more dirt than ordinary filters.
- 9 PRESSURE REGULATOR FOR MAIN GAS LINE** — Provides constant flame at the burner by maintaining uniform gas pressure.
- 10 LARGE BLOWER** — Of double-inlet type with large air-handling capacity. Silent in operation.
- 11 PILOT LINE PRESSURE REGULATOR** — Provides constant flame at the pilot by maintaining uniform gas pressure.
- 12 BLOWER MOTOR** — Capacitor type. Mounted on frame with blower. Equipped with special safety device which protects it against overloading.



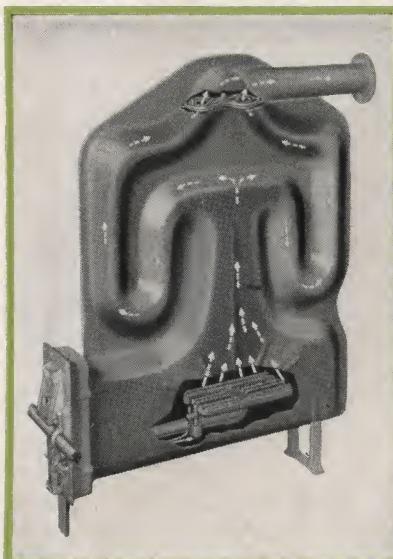
CONSTRUCTION FEATURES OF SUNBEAM SERIES M

- 1 EXTERIOR CABINET** — Constructed of No. 20 gauge steel. All parts are die cut and formed and are connected by interlocking slip-joints assuring ease of assembly and unusually air-tight seams. Pleasing proportions, rounded corners, the absence of exterior screws and fine grained, green crystalline enamel finish give this Unit an outstanding appearance.
- 2 INNER CASING** — Made of corrugated galvanized iron. Prevents heat from escaping into basement; brings circulating air into intimate contact with heating surfaces.
- 3 HEATING ELEMENT** — Constructed of steel. Electrically welded to eliminate joints.
- 4 AIR CIRCULATING SPACE** — Air circulates uniformly over the ample heat-radiating surfaces.
- 5 GAS VALVE** — Automatically turns burner on and off. Controlled by room thermostat.
- 6 THERMOSTATIC PILOT** — Automatically closes gas valve, thus shutting off the gas supply, if the pilot is extinguished.
- 7 INNER CASING AIR OPENINGS** — These openings permit the air circulating between the inner and outer casings to enter the plenum chamber.
- 8 FLUE OUTLET MANIFOLD** — Welded inseparably to the heating element, carries exhausted gases to the flue.
- 9 AIR FILTERS** — Hold more dirt than ordinary filters.
- 10 LARGE BLOWER** — Of double-inlet type with large air-handling capacity. Silent in operation.
- 11 BLOWER MOTOR** — Capacitor type. Mounted on frame with blower. Equipped with special safety device which protects it against overloading.
- 12 BURNER** — Insures efficient, uniform distribution of natural, manufactured or mixed gas; is quiet in operation.
- 13 PRESSURE REGULATOR FOR MAIN GAS LINE** — Maintains uniform gas pressure and constant flame at the burner.
- 14 PILOT LINE PRESSURE REGULATOR** — Maintains uniform gas pressure and constant flame at the pilot light.

SUNBEAM GAS FIRED AIR CONDITIONING UNIT



Cast iron heating element of the Sunbeam Series D.



Steel heating element of Series M showing burner and baffle. Arrows indicate gas travel

HEATING ELEMENT OF THE SERIES D SUNBEAM GAS FIRED AIR CONDITIONING UNIT

The heating element of the Series D Sunbeam Gas Fired Air Conditioning Unit, is built of rugged, durable cast iron. The sides of each element have perpendicular ribs which provide added heating surface and facilitate absorption of heat by the air which passes upward. Each element consists of two sections. No cement or putty is used in the assembly. The faces of each section are surface ground and are bolted together at close intervals to form a tight, metal-to-metal joint. An asbestos gasket is inserted, as shown in the illustration opposite, to further insure a permanently leak-proof union.

Five baffles placed horizontally above the burner, insure that the products of combustion are thoroughly utilized before passing to the flue. The design of the baffles forces the products of combustion to follow a "zig-zag" course as they rise, which causes them to impinge uniformly against the entire surface of the heating element.

HEATING ELEMENT OF THE SERIES M SUNBEAM GAS FIRED AIR CONDITIONING UNIT

The heating element is constructed of a specially selected grade of steel of 16 gauge thickness. Each heating element is made of two sections. Each section is formed on a gigantic press under a pressure of 500 tons! The two sections are permanently and hermetically sealed together by electric welding machines of the latest type. In effect, each Sunbeam heating element is a jointless, leak-proof unit.

The hot gases rise from the burner, are diverted equally to the front and rear, and are then collected at the central point at the top of the element assuring uniform heat distribution throughout the heating element. Long fire travel is needed to obtain this uniform distribution of heat and, because of this long fire travel, the heat is thoroughly utilized before the products of combustion reach the flue. High efficiency and low fuel consumption result from this design.

Gas passages are scientifically streamlined so that the products of combustion pass from burner to flue manifold with a minimum of resistance.

The flue manifold is securely welded to the top of the element, with the inlet opening at the center where the hot gas streams come together. Before the products of combustion reach the flue manifold, they pass through a baffle of cast iron construction which is located near the top of the heating element.

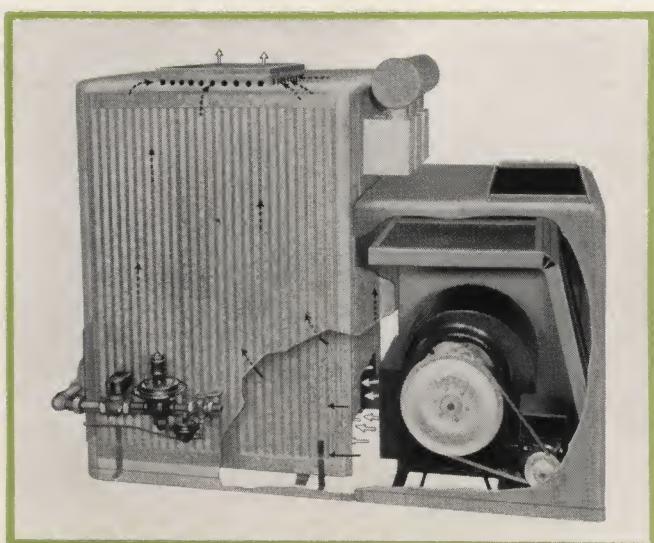
INNER CASING

The inner casing, made of corrugated galvanized iron, surrounds the heating element and serves the dual purpose of bringing the air into close contact with the heating elements and of keeping the outer cabinet cool.

Most of the air returned to the unit passes inside the inner casing through an opening provided directly opposite the blower outlet. A sufficient quantity of air from the blower is, however, diverted to the space between the inner and outer casings and, traveling upward, joins the heated air in the plenum, through a series of holes in the top of the inner casing.

In this manner, the corrugated surfaces of the inner casing are exposed to two currents of air; one moving within the inner casing, the other between the inner and outer casings. As a result practically no heat is lost. Since the air circulating between the inner and outer casings is of a low temperature the cabinet is relatively cool.

The illustration at the left shows the inner casing of the Series M. The inner casing of the Series D is similar in design and function.



Interior view showing inner casing and distribution of air within the heating compartment

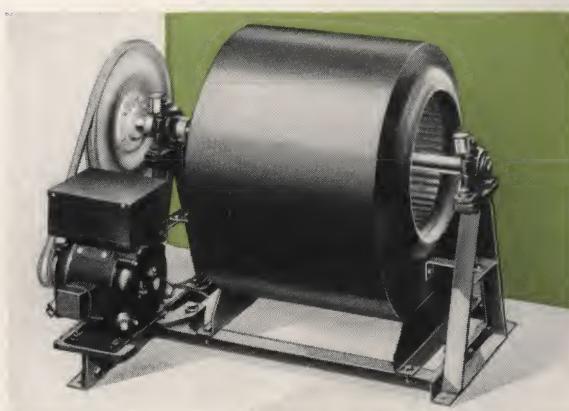
BLOWER

Blowers are large, powerful and silent. They operate at low speeds consuming a minimum of current, and move a large volume of air at low velocities and at comparatively low temperatures.

The blower and motor are securely mounted on an integral, rigid angle iron frame which prevents vibration and its possible resulting noise. Because of this integral base, pulleys are quickly and easily aligned and remain in alignment indefinitely.

Blowers have extra capacity for summer cooling operation or to overcome greater than average resistance in the ducts. Blowers are equipped with rubber mounted, self-aligning bearings. Large oil reservoirs are provided.

Motors are of the capacitor type, specially designed for air conditioning installations. They do not cause radio interference. Each motor is equipped with a special safety device which protects it against damage which might be caused by overloading.



Blower and motor mounted on integral base. Saves time in aligning pulleys.

AIR FILTERS

These filters combine the two desirable qualifications of high cleaning efficiency and long life. They offer comparatively little resistance to the circulating air after a period of service which finds many other types of filters completely clogged and in need of replacement. Their capacity to hold more dirt, dust, soot, lint, pollen and bacteria — and thus their longer life — is due to the "V" angle construction and to the fact that they can be treated with an unusually large amount of adhesive coating without filling up the passages through which the air must circulate. The accompanying illustration shows the advantages of the "V" angle construction. The air must "turn a corner" in the center of the filter. This turbulence causes all of the air to be wiped against the ample adhesive surfaces of the bottom section, thus removing a maximum of foreign matter. Since the openings in the bottom section are smaller, they are first to fill up. Unlike other makes of filters, the top section will not clog and lose its efficiency while the bottom section remains clean and unused. When clean filters are finally required, they can be obtained at the same low cost of ordinary filters.



Top view of section of Sunbeam Filter and a side view showing the "V" angle construction.

SPRAY HUMIDIFIER AND HUMIDITY CONTROL INSTRUMENT

This new type of spray humidifier, automatically controlled by a room humidistat, has proven its ability to properly humidify the air even in those sections where salts, lime, and "hard" water prevent the functioning of other types of humidifiers. When one nozzle does clog, it is turned off and the next one turned on, until all nozzles are clogged. All four nozzles are cleaned at one time—a simple operation requiring only a few minutes. Cleaning is necessary only a few times during a heating season.

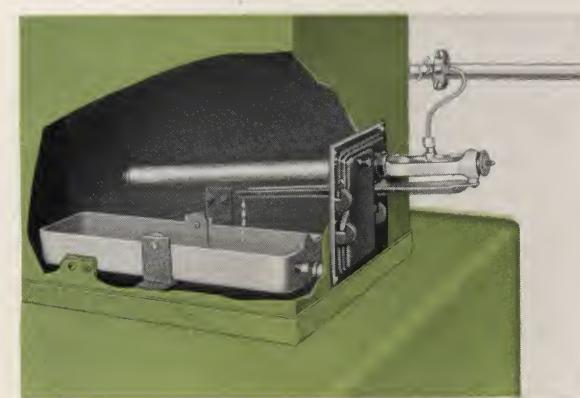
While this humidifier has the capacity to supply satisfactory relative humidity during the heating season, it also possesses another desirable feature. The amount of water atomized can be adjusted to the air's ability to absorb moisture — and thus prevent condensation in the plenum chamber — by changing the position of the atomizing plate.



Humidistat



This illustration shows spray humidifier equipped with four nozzles; capacity-adjusting atomizing plate; pressure reducing valve; solenoid valve; 2 strainers, one in front of pressure reducing valve and one back of solenoid valve; and pipe leading from aluminum pan to drain. Installation is made in plenum chamber in Series M as illustrated. In Series D, humidifier is located within the cabinet.



Drip Humidifier

DRIP HUMIDIFIER

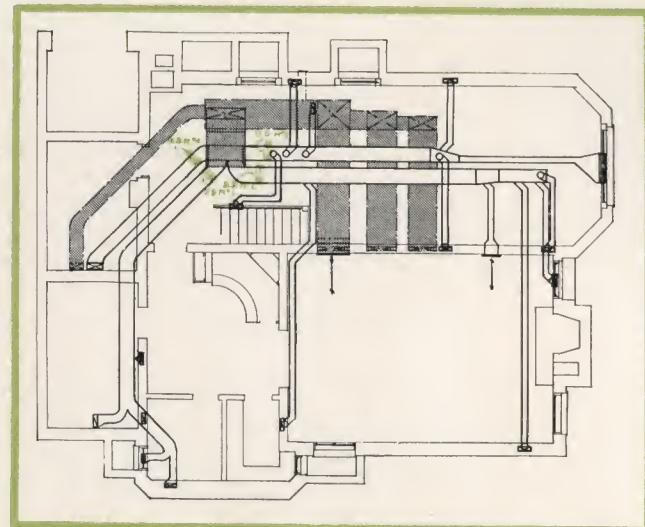
This apparatus connects to the water line. A thermostatic element expands and contracts with the temperature in the bonnet to admit more or less water to the evaporating reservoir. Humidifier is placed directly above the heating element. The amount of water evaporated by this humidifier is determined largely by temperature in bonnet and not by humidity requirement of living quarters. Humidifier has manual adjustment to vary flow of water into reservoir.

In the Series "D" the drip humidifier is located within the cabinet; in the Series "M", it is located in plenum chamber as shown opposite.

ZONE CONTROL OF TEMPERATURE

In houses of many rooms, or in houses of the rambling type it is generally difficult to maintain an even, uniform temperature in all rooms, whether the heating medium be air or water or steam, when the entire building is controlled by only one thermostat. Zone Control overcomes this difficulty. The house is divided into zones—two or more. A thermostat is placed in one of the rooms in each zone. A Trunk Line, or Main Duct with branches, leads directly from the Sunbeam Air Conditioning Unit to each zone. A Damper which is operated by a motor is installed in each main duct. When a zone thermostat calls for heat, the duct damper motor opens the damper in the duct which it controls, turns on heat source and blower. When the thermostat is satisfied it closes the damper which it controls, turns off heat source and blower. The heat source is on and blower is operating when any one zone thermostat is demanding heat.

Advantages of Zone Control include, besides uniform, even temperature in every room, quicker response and fuel economy because overheating is avoided. With Zone Control any desired temperature can be maintained in any zone.



A basement layout of a Zone Control Installation. Location of Duct Damper Motors is shown in green.



A ZONE CONTROL INSTALLATION

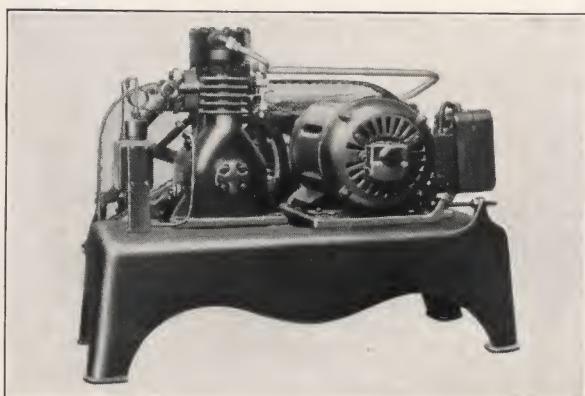
The illustration at left shows how the duct damper motors are installed — one in each main duct leading to each zone. Damper in the front duct is open as is the case when thermostat is demanding heat. When duct damper motor is in open position, it actuates a switch which closes the circuit to source of heat and blower, starting them in operation. When damper motor closes, it opens the circuit to source of heat and blower, stopping them, providing no other damper motor is keeping them in operation.

Notice that duct damper motors are located close to the air conditioning unit.

COOLING AND DEHUMIDIFYING EQUIPMENT

Where dehumidification and cooling are desired, the Sunbeam refrigerating unit with cooling coils can be installed in connection with the Sunbeam Winter Air Conditioning Unit. Or if cold water is available it can be circulated through cooling coils. The duct system and registers can be designed and sized to carry warm, conditioned air in winter when the heating plant is operating and also to distribute, cool, conditioned air in summer when the cooling plant is in operation.

Refrigerating equipment may be installed when the Sunbeam Winter (heating) System is installed, or it can be added later.



CONTROL EQUIPMENT

Temperature Control Equipment, for any degree of regulation that may be desired by any home owner, is available with Sunbeam Air Conditioning Units. Control combinations are provided which give control of temperature from one central point in a home, or from several different rooms.

The individual instruments, which are included in the various combinations, are generally considered the finest available. The proper combination of controls for each and every temperature regulation requirement is listed in the Price List for Sunbeam Series D and Series M Gas Fired Air Conditioning Units.



No. T-11-1 and No. T-21
Plain Thermostat



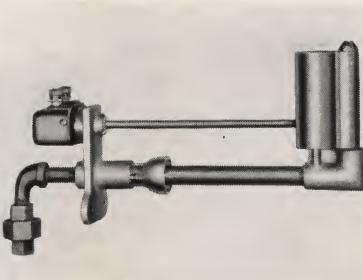
No. T-105-1 and No. 205-1
Night and Day
Electric Clock Thermostat



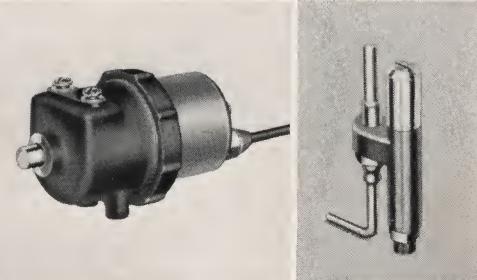
No. H-8
Humidistat



No. V-83
Solenoid Water Valve



No. C-80 Thermostatic Pilot



No. 550 Thermostatic Pilot



No. V-16
Gas Valve



No. V-15
Gas Valve



No. L-101-3
Blower and Limit Switch



No. R-155
Control Box



No. L-101-4 Blower,
Limit and High Cut-in Switch



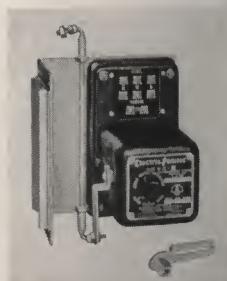
No. T-29-1
Night and Day Thermostat
(For Zone Control)



No. L-219-1
High Cut-in Relief Switch
(For Zone Control)



No. A-10 and No. B-10
Power Box
(For Zone Control)



No. M-26-6
Duct Damper Motor
(For Zone Control)

RATINGS, DIMENSIONS AND SPECIFICATIONS

RATINGS — SERIES D

No.	A. G. A. B. T. U. Input per hr.	B. T. U. Capacity at Registers	Number of Burners	Gas Supply Tapping In.	Diameter Flue Outlet Manifold	Approx. Distance from floor to Center of Flue Outlet Manifold
D-2	140,000	107,100	2	1	7"	61½"
D-3	210,000	160,650	3	1	8"	62"
D-4	280,000	214,200	4	1½	9"	62½"
D-5	350,000	267,750	5	1½	10"	63"

BLOWER - MOTOR - FILTER SPECIFICATIONS — SERIES D

No.	Blower No.	*C. F. M. at 65° F.	*Approx. Blower R. P. M. at ¼" S.P.	Diameter of Wheel	Pitch Dia. of Blower Pulley	Number Blowers	Motor H. P.	Motor R. P. M.	Number Filters
D-2	1-12	1016	401	12"	12"	1	¼	1725	2 (16"x25")
D-3	1-15	1526	344	15"	15"	1	⅓	1725	3 (16"x25")
D-4	1-18	2032	300	18"	15"	1	½	1725	4 (16"x25")
D-5	2-15	2540	344	15"	15"	2	½	1725	4 (16"x25")

*Air heated from 65° to 165° F. increases 19% in volume. Therefore, warm air ducts should have capacity for 19% greater C. F. M. than listed above.

DIMENSIONS — SERIES D

No.	Width of Heating Compartment	Overall Depth	Overall Height	Width of Blower Compartment	Height of Blower Compartment	*Depth of Blower Compartment	Air Discharge Opening	Air Intake Opening
D-2	44½"	75¾"	58"	39½"	41¾"	28"	16"x22"	12¾"x35¼"
D-3	56"	76¾"	58"	48¼"	41¾"	29"	16"x34"	12¾"x44"
D-4	70½"	79½"	58"	65¾"	41¾"	32½"	16"x45"	12¾"x59¼"
D-5	82"	76¾"	58"	86"	41¾"	29"	16"x56½"	12¾"x70"

*Allow clearance in rear equal to depth of blower compartment for removal of filters, blower and motor. Allow 24 inches clearance in front for removal of baffles.

RATINGS — SERIES M

No.	A. G. A. B. T. U. Input per hr.	B. T. U. Capacity at Registers	Number of Burners	Gas Supply Tapping In.	Diameter Flue Outlet Manifold	Approx. Distance from floor to Center of Flue Outlet Manifold
M-2	80,000	61,200	2	¾	6"	52½"
M-3	120,000	91,800	3	¾	6"	52½"
M-4	160,000	122,400	4	1	7"	53¾"
M-5	200,000	153,000	5	1	8"	53½"

BLOWER - MOTOR - FILTER SPECIFICATIONS — SERIES M

No.	Blower No.	*C. F. M. at 65° F.	*Approx. Blower R. P. M. at ¼" S.P.	Diameter of Wheel	Pitch Dia. of Blower Pulley	Number Blowers	Motor H. P.	Motor R. P. M.	Number Filters
M-2	1-9	580	550	9¼"	12"	1	¼	1725	2 (16"x25")
M-3	1-12	870	380	12"	12"	1	⅓	1725	4 (20"x20")
M-4	1-12	1160	475	12"	12"	1	½	1725	4 (20"x20")
M-5	1-15	1450	340	15"	15"	1	⅓	1725	4 (20"x20")

*Air heated from 65° to 165° F. increases 19% in volume. Therefore, warm air ducts should have capacity for 19% greater C. F. M. than listed above.

DIMENSIONS — SERIES M

No.	Width of Heating Compartment	Overall Depth	Overall Height	Width of Blower Compartment	Height of Blower Compartment	*Depth of Blower Compartment	Air Discharge Opening	Air Intake Opening
M-2	20"	66¾"	54"	32"	28½"	26¾"	16"x14"	10"x28½"
M-3	28½"	69½"	54"	40"	36½"	29½"	16"x22½"	14"x36½"
M-4	37"	69½"	54"	40"	36½"	29½"	16"x31"	14"x36½"
M-5	45½"	73¾"	54"	48½"	39"	33¾"	16"x39½"	16"x45"

*Allow clearance in rear equal to depth of blower compartment for removal of filters, blower and motor.

SUNBEAM

Modern

BLOWER-FILTER UNITS



SUNBEAM BLOWER-FILTER UNITS offer owners of gravity furnaces, positive, uniform delivery of warm, clean, filtered air in winter and, in summer, cooling ventilation through the circulation of air.

The Sunbeam Blower-Filter Unit is available complete with blower, motor, pulleys—including adjustable pulley for motor—belt and filters.

The genuine Sirocco Blower, and the Motor are specially designed for operation with furnaces and possess a number of outstanding features.

Added to the mechanical superiority of the Sunbeam Blower-Filter Unit is a handsome, newly designed cabinet. Corners are gracefully rounded. Unsightly bolts and screws are eliminated or concealed. Green crystalline baked enamel gives a most attractive finish. All parts of the heavy, No. 20 gauge cabinet are die cut and formed. Slip joints eliminate the use of screws and provide snug-fitting, air-tight connections.

SURPRISINGLY LOW IN COST

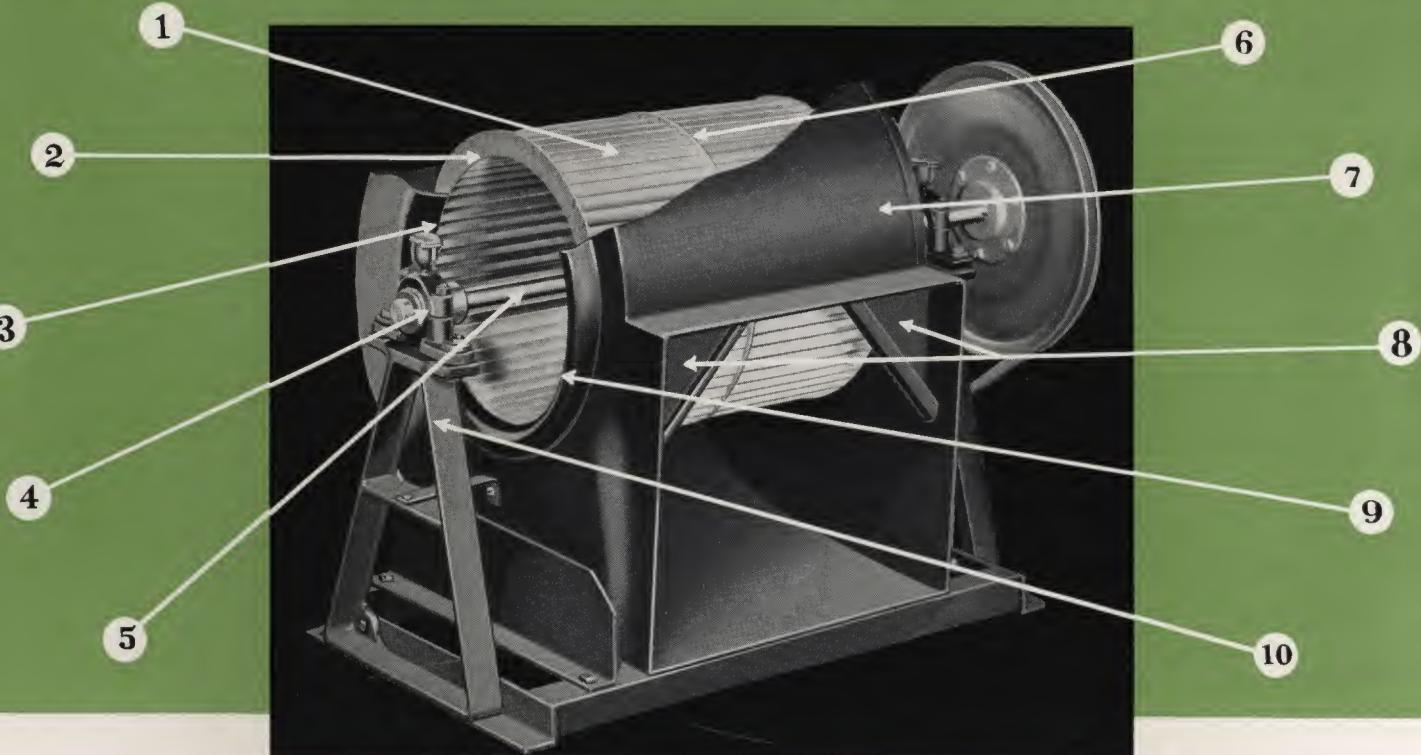
The Sunbeam Blower handles more air per revolution than any other type of blower. Frequently, the Sunbeam Blower, with a 12" wheel for example, actually delivers more air than an ordinary blower with a larger wheel—and costs less than the larger blower which also requires more space and consumes more power.

When you select blowers, compare them not on the size of the blower wheel, but on the basis of Certified Ratings or capacities based on tests made in accordance with the Code of the National Association of Fan Manufacturers and The American Society of Heating and Ventilating Engineers. Hundreds of thrifty heating contractors who purchase on this basis are choosing the Sunbeam, because its high efficiency makes it one of the most economical blowers that can be obtained.

THE FOX FURNACE COMPANY • ELYRIA, OHIO

DIVISION OF AMERICAN RADIATOR AND STANDARD SANITARY CORPORATION

10 REASONS WHY SUNBEAM BLOWERS ARE SUPERIOR



Sunbeam Blowers are without equal in quiet, efficient operation, consume less power, and deliver any given volume of air at a lower operating speed than ordinary blowers because:

- 1 BLADES ARE DIE FORMED so that each one will handle exactly the same amount of air, assuring smooth operation. There are 48 blades in the No. 1-9; 60 blades in the No. 1-12; and 64 blades in the Nos. 1-15, 1-18 and 1-21 blowers. Blades are forward curved and each one handles a small amount of air which explains why this blower is so quiet and efficient.
- 2 SIDES OF BLOWER WHEELS, and slots where blades attach, are die-formed to insure absolute uniformity. If just one of the many blades were not in perfect alignment with the balance, smooth operation would be sacrificed. Blades are riveted to sides of wheel so they cannot come loose or rattle.
- 3 PRECISION FITTING OF WHEEL AND HOUSING—Wheel revolves within a small fraction of an inch of the housing, so that entering air is drawn immediately into the blades and turbulence and friction are eliminated. Each wheel is statically and dynamically balanced so it will revolve evenly and will not touch housing, despite the very close clearance.
- 4 SELF-ALIGNING BEARING SOCKET keeps bearings in alignment at all times, thereby reducing bearing wear, and power consumption.
- 5 EXTRA HEAVY SHAFTS AND BEARINGS, and large capacity oil reservoirs, insure many years of operation with practically no need for service, repairs or replacement of parts. Oil reservoir holds several months' supply of lubrication.

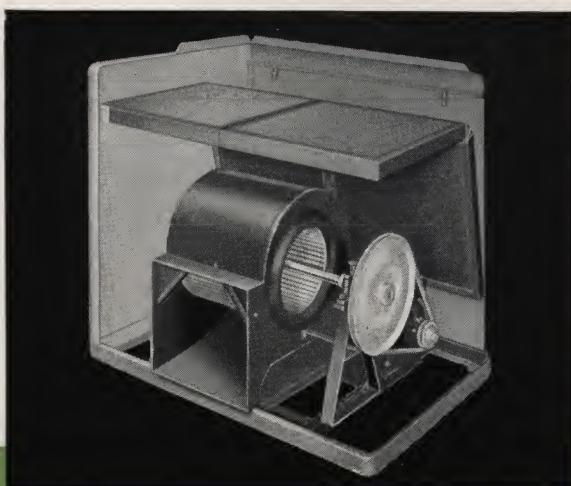
6 CENTER PLATE gives each Sunbeam DOUBLE-INLET, DOUBLE-WIDTH Blower the effect of 2 blowers, reduces air turbulence and friction, and gives better air distribution. Blades are securely anchored in die-cut slots in Center Plate, providing rigid construction and a short span which assures uniform spacing between blades, when wheel is revolving. A special stamping operation after blades are inserted through die-cut slots in Center Plate fastens them securely and permanently, and prevents the possibility of rattles.

7 HOUSING IS WELDED to provide a smooth surface that will not set up any avoidable resistance to the flow of air.

8 CUT-OFF AT DISCHARGE OUTLET, a new, patented feature, provides even distribution of the air at all points of the outlet. The Sunbeam is the only blower with an outlet cut-off designed for the low pressure duty, which is encountered in a residential air conditioning system.

9 STREAM-LINED INLET has been scientifically engineered and is die-formed. Because of this stream-lined inlet, the wheel opening is 99% effective in admitting air. Wheel openings without this construction are frequently less than 80% effective. Both sides of this DOUBLE-INLET, DOUBLE-WIDTH blower are equipped with stream-lined inlets.

10 BEARING MOUNTING is located away from blower wheel so that it offers practically no resistance to air entering blower. Bearings are mounted on vibration-absorbing rubber.



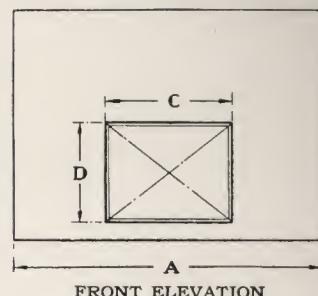
Interior view showing position of blower, motor and filters. Blower and motor are mounted on an integral, angle iron base which prevents vibration, saves time in aligning pulleys and keeps pulleys in alignment indefinitely. Note large amount of filtering surface, and how vertical row of filters extends to bottom of rear access door.



Rear view, with access door and vertical row of filters removed.

BLOWER - MOTOR - FILTER SPECIFICATIONS

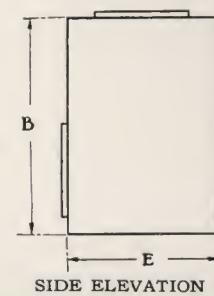
No.	Diameter Blower Wheel	Pitch Diameter Blower Pulley	Number of Blowers	*Motor H. P.	Motor R. P. M.	Number of Filters
1-9	9 1/4"	12"	1	1/4	1725	2-(16" x 25")
1-12	12"	12"	1	1/4	1725	4-(20" x 20")
1-15	15"	15"	1	1/3	1725	4-(20" x 20")
1-18	18"	15"	1	1/2	1725	5-(16" x 25")
1-21	21"	15"	1	3/4	1725	6-(16" x 25")



*MOTORS. Capacitor type motors, especially designed for use with furnace blowers, are standard equipment. They do not cause radio interference. Each motor is equipped with a special safety device which prevents damage which might be caused by overloading or fluctuations in current.

DIMENSIONS

No.	A Width	B Height	E Depth	C Width of Air Discharge Opening	D Height of Air Discharge Opening	Return Air Opening
1-9	32"	28 1/4"	26 7/8"	11 5/16"	9 9/16"	28 1/2" wide x 10" deep
1-12	40"	36 1/4"	29 1/2"	14 9/16"	12 9/16"	36 1/2" wide x 14" deep
1-15	48 1/2"	41"	33 3/4"	20 5/16"	15 9/16"	45" wide x 16" deep
1-18	54 5/8"	41"	36 3/8"	24 9/16"	18 5/8"	51 1/8" wide x 20" deep
1-21	58 1/2"	51 1/4"	42 1/2"	28 3/4"	21 5/8"	55" wide x 24" deep



HOW TO DETERMINE SIZES OF BLOWERS NEEDED

The proper size blower for connection to a gravity furnace can be selected in accordance with the information given below when the Standard Code rating in square inches—or the Btu capacity—is known.

Multiply the square inch rating by 2 to obtain C.F.M. (Cubic Feet of Air Per Minute) required. Multiply the Btu capacity (at register) by .011 to obtain C.F.M. (Cubic Feet of Air Per Minute) required.

When C.F.M. is known refer to tables on back page and select blower that will provide this C.F.M.

EXAMPLES: 502 square inches x 2 = 1004 C.F.M.
No. 1-12 Blower Unit (1008 C.F.M. at 1/4" S.P.,
1460 Tip Speed, 465 R.P.M., .144 B.H.P.)
177,000 Btu x .011 = 1947 C.F.M.
No. 1-15 Blower Unit (1962 C.F.M. at 1/4" S.P.,
1498 Tip Speed, 382 R.P.M., .24 B.H.P.)

SUGGESTIONS FOR BAFFLING GRAVITY FURNACES

Before a blower is connected to a gravity furnace, the heating plant should be baffled to reduce the amount of air circulating area and particularly to bring the air into intimate contact with the furnace

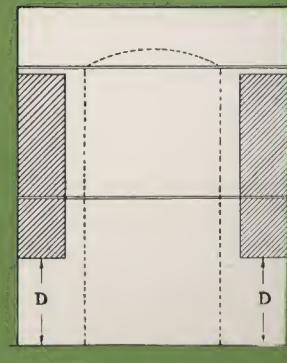
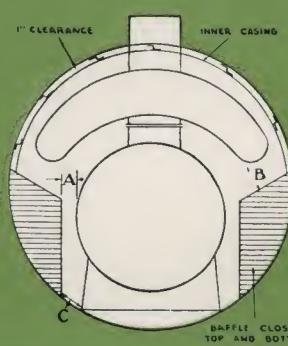
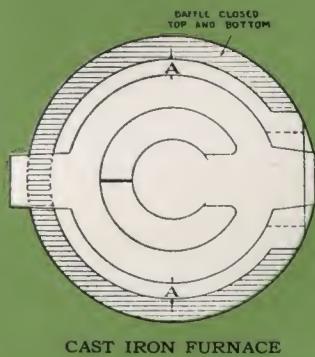
heating element. In the illustrations below are given suggestions for properly baffling casings of both the cast iron and steel types of gravity furnaces.

CAST IRON FURNACE

The sketch at left shows the top view of a cast iron furnace and how the area close to the casing should be closed, or baffled, so that no air can circulate through this space. The baffle should extend from the top of the blower outlet to the top of the upper casing sheet. The baffle should follow the contour of the radiator, and should be spaced in accordance with the accompanying table.

STEEL FURNACE

The sketches at right show the top and front views of a steel furnace and how the shaded area should be closed, or baffled, so that no air can circulate through this space. The baffle should extend from the top of the blower outlet to the top of the upper casing sheet. It should be sized in accordance with the table below.



STEEL FURNACE

DIAMETER OF FIRE POT	A	DIAMETER OF FIRE POT	A
16"	3"	26"	3 3/8"
18"	3"	28"	3 1/2"
20"	3"	30"	3 3/4"
22"	3 1/4"	32"	4"
24"	3 1/4"		

DIAMETER OF DRUM	20"	22"	24"	27"	30"	34"
A	4"	4"	4"	5"	5"	5"
B	3 1/2"	3 1/2"	3 1/2"	4 1/2"	4 1/2"	5"
C	4"	4"	4"	4"	4"	4"
D	14 1/4"	15 3/16"	15 3/16"	18 3/16"	21 1/4"	24 1/4"

All Sunbeam Blower-Filter Units are equipped with GENUINE SIROCCO Blowers, manufactured by the world's largest maker of blowers with more than 50 years of experience.

BLOWER CAPACITY TABLE

CERTIFIED RATINGS—Air Deliveries, or Capacities, are in accordance with Standard Test Code for Centrifugal and Propeller Fans adopted jointly by the National Association of Fan Manufacturers and the American Society of Heating & Ventilating Engineers

NO. 1-9 BLOWER

VOLUME C. F. M.	OUTLET VELOCITY F. P. M.	1/16" S. P.			1/8" S. P.			3/16" S. P.			1/4" S. P.			3/8" S. P.			1/2" S. P.		
		TIP SPEED	RPM	BHP	TIP SPEED	RPM	BHP												
594	800	935	386	.036	1130	467	.052	1290	532	.068	1460	603	.086				2064	853	.22
668	900	1000	413	.048	1187	490	.064	1333	550	.082	1480	611	.100				2083	861	.26
742	1000	1075	444	.060	1243	513	.080	1394	576	.098	1528	631	.118	1790	739	.160	2105	870	.30
816	1100	1142	471	.078	1298	536	.096	1448	598	.118	1579	652	.140	1817	750	.182	2150	888	.32
890	1200	1230	508	.098	1364	564	.112	1512	624	.140	1635	675	.164	1855	766	.20	2197	906	.36
965	1300	1325	547	.124	1437	594	.140	1575	650	.166	1690	699	.196	1908	788	.24	2260	934	.42

NO. 1-12 BLOWER

1008	800	935	298	.062	1130	360	.088	1290	411	.114	1460	465	.144						
1134	900	1000	318	.08	1187	378	.11	1333	424	.138	1480	471	.17						
1260	1000	1075	342	.104	1243	396	.136	1394	444	.168	1528	486	.20	1790	570	.28			
1386	1100	1142	364	.132	1298	413	.164	1448	460	.20	1579	502	.24	1817	578	.30	2064	658	.40
1512	1200	1230	392	.168	1364	434	.20	1512	481	.24	1635	520	.28	1855	590	.36	2083	663	.44
1638	1300	1325	422	.20	1437	457	.24	1575	501	.28	1690	538	.32	1908	607	.40	2108	670	.50
1764	1400	1410	449	.26	1508	480	.28	1623	517	.32	1750	556	.38	1960	624	.44	2150	683	.56

NO. 1-15 BLOWER

1744	800	914	232	.081	1117	285	.111	1297	330	.165	1487	379	.21						
1962	900	971	247	.105	1164	297	.143	1330	339	.18	1498	382	.24						
2180	1000	1032	263	.135	1219	310	.18	1375	350	.225	1522	388	.27	1818	463	.39			
2398	1100	1100	280	.165	1271	324	.21	1424	363	.255	1563	398	.315	1832	466	.435	2100	535	.555
2616	1200	1168	298	.225	1328	338	.255	1483	378	.315	1614	411	.36	1860	474	.48	2105	536	.63
2834	1300	1230	314	.27	1389	354	.315	1540	392	.375	1660	423	.42	1898	484	.555	2120	537	.69
3050	1400	1302	332	.33	1445	368	.375	1590	405	.435	1719	437	.495	1942	495	.615	2148	547	.765

NO. 1-18 BLOWER

2510	800	884	187	.111	1098	233	.159	1278	271	.225	1465	311	.285					2070	439	.765
2825	900	940	199	.1275	1140	242	.195	1307	277	.255	1470	312	.33					2075	440	.855
3140	1000	999	212	.1875	1188	252	.24	1351	287	.315	1501	319	.375	1792	380	.54	2088	444	.96	
3455	1100	1052	223	.24	1232	262	.285	1390	295	.36	1535	326	.435	1804	383	.60	2114	448	1.065	
3770	1200	1110	236	.30	1280	272	.345	1442	306	.42	1580	336	.495	1830	388	.675	2150	456	1.17	
4080	1300	1178	250	.375	1343	285	.42	1490	316	.495	1630	346	.57	1870	397	.765	2196	465	1.29	
4395	1400	1230	261	.45	1400	297	.51	1540	327	.57	1673	355	.66	1905	404	.855	2238	474	1.41	
4710	1500	1297	275	.54	1463	310	.615	1593	338	.675	1720	365	.765	1945	413	.96	2280	484	1.56	

NO. 1-21 BLOWER

3425	800	884	161	.15	1098	200	.225	1278	232	.30	1465	266	.39					2070	376	1.05
3850	900	940	171	.195	1140	207	.27	1307	238	.36	1470	267	.45					2075	377	1.17
4280	1000	999	181	.255	1188	216	.33	1351	246	.42	1501	273	.51	1792	326	.72	2088	380	1.305	
4710	1100	1052	191	.315	1232	224	.39	1390	253	.495	1535	279	.60	1804	328	.81	2114	384	1.44	
5135	1200	1110	202	.405	1280	233	.48	1442	262	.57	1580	287	.69	1830	333	.915	2150	391	1.59	
5565	1300	1178	214	.51	1343	244	.57	1490	271	.675	1630	296	.78	1870	340	1.035	2196	399	1.755	
5990	1400	1230	224	.615	1400	254	.69	1540	280	.78	1673	304	.90	1905	346	1.155	2238	406	1.935	
6420	1500	1297	236	.75	1463	266	.825	1593	290	.915	1720	313	1.035	1945	354	1.305	2280	414	2.13	

NOTE NO. 1—Using capacities below underscorings results in noise being encountered.

Symbols: S.P. = Static Pressure or Resistance.

C.F.M. = Cubic Feet of Air per Minute.

RPM = Revolutions per Minute.

F.P.M. = Feet per Minute.

BHP = Brake Horse Power or size of Blower Motor.

Following is a list of Sunbeam Air Conditioners and the number of the blower with which each is equipped

No. 720-R No. M-2 No. 5520	No. 1-9	No. 124	100,000 to	No. 1-15	No. 434	187,000 to	No. 1-21
		No. 224	123,000		No. 634	285,000 Btu	
		Btu					
		No. D-2			No. D-4		
		No. M-3			No. 3080		
		No. M-4			No. 27-S		
		No. 2280			No. 24-S		
		No. 5220			No. 2780		
		No. 2480			No. 5522		
		No. 4020			No. 5524		
		No. 4420			No. 5527		